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COMPUTERWORLD

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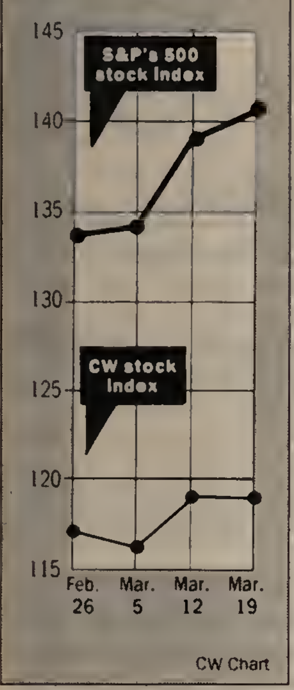
Stock update



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TOP OF THE NEWS

Large users are hesitant about upgrading to PC-DOS 3.2, which supports 3½-inch drives and was announced by IBM last week. **Page 2.**

■

Hard disk drive cards are selling fast, but the market may be short lived. **Page 31.**

■

Wide-area network promises are the prime draw at Interface '86 this week. **Page 6.**

■

Hewlett-Packard today announces enhancements to its laptop with a new display and added memory. **Page 10.**

■

Leasing executives bemoan a slow market. **Page 166.**

■

Symbolics, Inc. is scheduled to announce a $30,000 symbolic processing system in New York on April 16. A source close to the company said the new model is a gate array machine that is smaller than previous Symbolics models and has a larger, 18-in. screen design.

■

The first uniprocessor in the IBM 3090 family, the Model 180 intermediate mainframe, shipped two weeks earlier than scheduled; the first system was delivered to Boston's Shawmut Corp. last week. Shawmut officials said the Model 180 will serve 1,700 on-line terminals and 400 automated teller machines and that the installation went smoothly. It was scheduled to be placed in production last weekend.

■

Control Data last week distanced itself from its Commercial Credit Co. subsidiary by naming a new board of directors for the financial company, establishing a third-party review process to look at CDC actions that may affect Commercial Credit and restricting the amount of CDC receivables Commercial Credit can hold. The move was intended to make Commercial Credit more autonomous and encourage credit rating agencies to provide it

See **NEWS** page 6

Burroughs fills CPU gap

New A series uniprocessor provides upgrade pathway

By James Connolly

DETROIT — Aiming to plug an apparent hole in its mainframe lineup, Burroughs Corp. last week introduced a large-scale uniprocessor, the A 12 system. The new unit fits above the company's 5-month-old A 10 system and provides an upgrade path to the high-end A 15 system product line.

"The A 12 provides a new entry point into the top end of the Burroughs A series of mainframes. The system was designed for the user who needs a very large-scale mainframe and wants to be able to grow into an A 15," said Fred R. Meier, vice-

See **BURROUGHS** page 8

PC tied to Unix over Ethernet

By Elisabeth Horwitt

SAN JOSE, Calif. — A communications link that provides transparent exchange of data between IBM Personal Computers and a variety of hosts running Unix over Ethernet local-area networks will be introduced this week by Excelan, Inc.

The network vendor will expand its Ethernet product line with two offerings that permit applications written for the IBM PC Network Netbios interface to share data with Unix applications, using the Transmission Control Protocol/Internet Protocol.

Exos 8502-01 software, priced at $95,

See **ETHERNET** page 12

IRS systems need revamp, auditors say

By Mitch Betts

WASHINGTON, D.C. — Despite recent protests that it has fully recovered from its disastrous 1985 tax processing season, the Internal Revenue Service is reported to be still facing serious, lingering problems with IRS computer operations.

The most damning report of the several prepared following the 1985 fiasco was written by Electronic Data Systems Corp., which conducted its confidential review under contract to the IRS. The report, recently obtained by *Computerworld* from the U.S. House of Representatives Ways and Means Committee, concluded that the IRS lacks a strategic plan for data processing and communications, has no comprehensive disaster recovery plan and operates a returns processing system that is "inefficient, fragmented and difficult to maintain."

Investigators detail last year's systems problems. Page 4.

"The IRS should strongly consider the eventual redesign and integration of the entire returns processing system," said EDS, the systems integration subsidiary of General Motors Corp. "A well-designed returns processing system would streamline and integrate all subsystems that now function separately and inefficiently," it added.

IRS officials declined to comment on the report for publication, but in congressional testimony they have said the agency is working to correct the flaws identified in the numerous investigations of the 1985 processing season.

Indeed, the agency has beefed up computer capacity by 40%, streamlined its

See **IRS** page 4

CW EXCLUSIVE

Track record: IBM outruns pack with tape cartridge device

By Donna Raimondi

The 2-year-old IBM tape cartridge device, the 3480, has been a stunning success with large systems users, according to industry observers who expect the ½-in., 18-track tape format to become the dominant large-system backup storage medium.

IBM last year sold more drive units with its 2-year-old tape cartridge technology than plug-compatible manufacturers sold with 3420-type reel-to-reel devices, according to one estimate. As a result, industry observers predict that other vendors will have to scramble to catch up.

At Canon U.S.A., Inc., the data processing department converted eight 3420 tape drives to eight IBM cartridge drives. Tetsuro Kouga, DP manager at Lake Success, N.Y.-based Canon, enthusiastically recommends converting from reel-to-reel storage. The IBM 3480 devices "are much more reliable than 3420s," he asserts after almost a year of operating the devices and converting 6,000 data tapes. "We had bad experiences with 3420 read/write errors, but we are satisfied with the 3480s."

Canon's Kouga

Prudential Insurance Company of America's south central division in Jacksonville, Fla., replaced four strings of reel-to-reel tapes (32 devices) with three strings of cartridge units (24 devices) in a two-month period last year. Richard Sieg, manager of computer operations with the Prudential division, says the conversion has simplified tape handling and reduced the number of people needed to maintain tapes.

Customers are not the only people thinking seriously about the device. IBM's competitors have been scrambling to release their own versions of the 3480 — but none have yet accomplished the feat.

The cartridge technology, which allows up to 20% more data to be packed into a quarter of the space of a

See **IBM** page 14

NEWSPAPER

PC-DOS upgrade supports 3½-in. floppy disk drives

Users, vendors hesitate to adopt enhancement

By Douglas Barney

BOCA RATON, Fla. — In a letter to its authorized dealers last week, IBM announced PC-DOS 3.2, which is required to run its Token-Ring local-area network, and which supports 3½-in. micro floppy disks drives. Large users contacted by *Computerworld*, however, expressed reluctance to upgrade to the new $95 operating system.

"We will probably wait and see. When DOS 3.1 came out, we didn't all go to it," said a personal computer specialist with a Fortune 500 conglomerate who asked not to be identified. The firm, which has some 5,000 personal computers, still uses PC-DOS 2 on some machines. "People that need to take advantage of the capabilities of DOS 3.2 will upgrade to it. If a secretary doesn't need 3.2, why spend the money for it?" the specialist asked.

"If we start seeing some 3½-in. drives out there, we probably would be encouraged to go ahead and have everybody upgrade so they can communicate with the 3½-in. drives. I think it is going to address something that IBM is going to announce shortly," said Greg Allman, senior consultant in the personal computer department at Deloitte Haskins & Sells, an accounting firm based in New York.

Walter Kennamer, senior manager in the national computer audit group for Ernst & Whinney, a Cleveland-based accounting firm, said the major inconvenience of upgrading to 3.2 rules out a full-scale conversion. "It is a large administrative effort to switch operating systems, and the vendors didn't make it any easier for us," he said.

Although PC-DOS 3.2 supports 3½-in. floppy disk drives, IBM currently sells no computers in the U.S. using those drives, and PC-DOS 3.2 itself will be released on a 5¼-in. floppy disk, available in April. IBM spokesman Buddy Price refused to comment on why PC-DOS 3.2 supports 3½-in. drives.

Observers, however, have long believed that IBM's much-rumored laptop machine will use 3½-in. drives. There have also been some indications that IBM will move toward 3½-in. drives for its desktop machines.

Laptop will use 3½-in. drives

"Within the past six months, IBM made two fairly major procurements of 3½-in. floppies. The laptop is going to use 720K-byte 3½-in. drives, and there are a couple hundred thousand 3½-in. 1.2M-byte drives that IBM isn't using in anything right now," said Brian Jeffrey, director of research for the International Technology Group of Palo Alto, Calif.

Some analysts have also speculated that IBM will announce its laptop, and possibly a desktop, with 3½-in. floppy disk drives, as early as next month.

But analysts also say they believe that even IBM will have difficulty in overcoming the entrenched marketing power of the 360K-byte, 5¼-in. floppy disk drive. "I don't think they are going to be successful doing it. There is too much inertia. People do not like conversions," said Marty Gruhn, an analyst with The Sierra Group of Tempe, Ariz.

Software vendors also were skeptical about the transition to 3½-in. drives. "I can't predict when Ashton-Tate or any other company would distribute its software on 3½-in. disks for the IBM PC. I think that will be some time off; there would have to be a considerable demand for it," said Robert Carr, chief scientist for Ashton-Tate.

New PC-DOS may smooth transition

But the new PC-DOS may smooth the transition to 3½-in. drives with the its ability to transfer files from 5¼-in. to 3½-in. disks, thus allowing users to copy software to the new format once issues of copy-protected software being transferred are resolved, users said. The XCOPY command in 3.2, which provides this capability, already had the ability to transfer files between 5¼-in. drives of different densities, such as the 360K-byte drives and the 1.2M-byte drives.

Additionally, the XCOPY command allows users to copy files from more than one subdirectory simultaneously or to selectively copy files that have either been changed since the last XCOPY or were created after a given date.

IBM also removed the default drive function. Previously, with a hard-disk system, the hard disk drive was the default drive and designated as the "C" drive. Careless users wishing to format a floppy disk sometimes would fail to specify the floppy drive. The system would then format the default drive, which would reformat the hard disk and destroy the hard-disk data.

Other features include file locking, background printing, virtual hard disk support and a JOIN command to splice directories.

MS-DOS 3.2 expected

Microsoft Corp. is expected to make an MS-DOS 3.2 version available to compatible manufacturers that shares the same features as IBM's PC-DOS 3.2. "We have in the past made all updates of DOS available to our OEMs, and I would see no reason why we would be inconsistent with that policy at this time," said Marty Taucher, a Microsoft spokesman.

IBM's announcement of the IBM Personal Computer Xenix Version 2, a multiuser operating system for the IBM PC AT based upon Microsoft's Xenix System V, also reawakened some questions about IBM's operating system strategy for the PC line.

Adrian King, director of Microsoft operating systems, claimed the IBM announcement positions Xenix as "the multiuser operating system of choice" for micros. IBM, however, maintains its goal of providing a multiuser, multitasking PC-DOS, according to Price. Analysts believe that Xenix will remain a niche operating system and that PC-DOS and MS-DOS will eventually provide multiuser capability.

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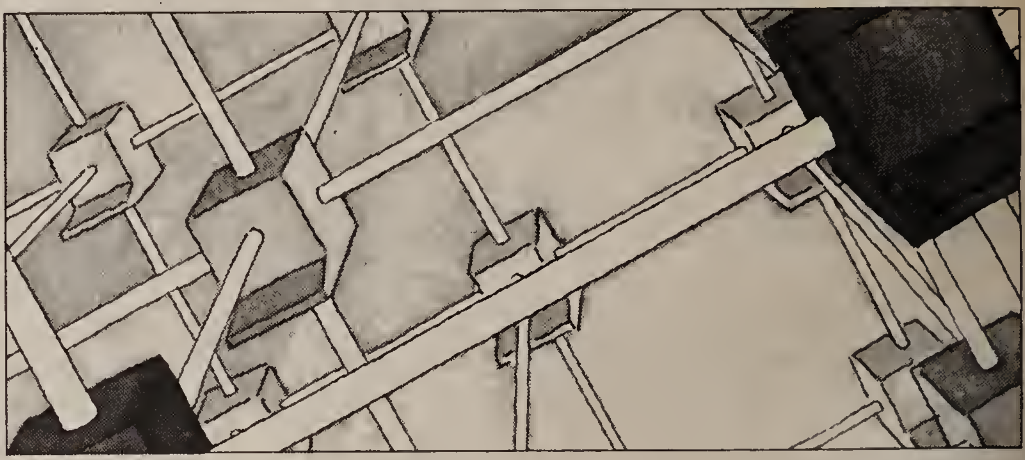

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Texas Instruments unveiled a series of 32-bit multiprocessor minis with an enhanced Unix operating system supporting up to 128 users/ **51**

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Many third-party leasing firms believe they will be better served by diversifying/ **166**

Control Data announces plans to offer third-party software support to IBM and DEC users/ **166**

EXECUTIVE REPORT

Up to a year ago, all managers of microcomputer networks shared one attribute: a strong sense of adventure. Such a spirit was necessary because implementing most early networks required a certain amount of experimentation. *Computerworld* interviewed early net managers so today's managers can learn from the experiences of the pioneers. By Joanne Kelleher/ **59**

IN DEPTH

Where are you heading, MIS? Management should help move technology out into the office, not hinder the effort. By John Connell/ **79**

"If the phone company owned the Pick system, there would be no Unix." Pick users believe they have found the answer to their computing needs and wonder why others do not seek the same salvation. By Philip Gill/ **89**

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GAO details systems woes

IRS backlog blamed on untested systems

WASHINGTON, D.C. — Just about everything that could go wrong did go wrong at the Internal Revenue Service tax processing centers last year.

According to an investigation conducted by the U.S. General Accounting Office (GAO), the big backlogs of unprocessed tax returns were caused by a variety of hardware, software and management problems.

IRS officials tended to ignore the management issues and blamed the episode on processor delivery delays, faulty disk drives and software problems.

However, Sperry Corp., the hardware vendor, tends to blame the software.

A report issued by the House Appropriations Committee's staff said the whole project to replace the processors at the IRS service centers was a rush job.

The investigators concluded that "top IRS management had committed itself to having the hardware and all four software phases operational in the service centers by January 1985 and would neither be deterred from that goal nor brook any serious objections to it."

Insufficient testing

An IRS official told *Computerworld* that insufficient testing was done before the system was put online but that the rush was necessary because of the risks of using the old Honeywell, Inc. and Control Data Corp. mainframes, which dated back to the 1960s.

In its comprehensive study, which was presented to the U.S House of Representatives' Ways and Means Committee, the GAO cited the chief causes of the 1985 backlog:

- The contractors delivered some CPUs and tape drives late, so seven out of 10 IRS service centers did not have sufficient computer capacity for their 1985 workload.
- The new Cobol programs took longer to run than they should have, perhaps because the new programs were written by IRS programmers who were relatively inexperienced with the Cobol language.
- IRS programs either did not contain good checkpoint routines or had none at all.

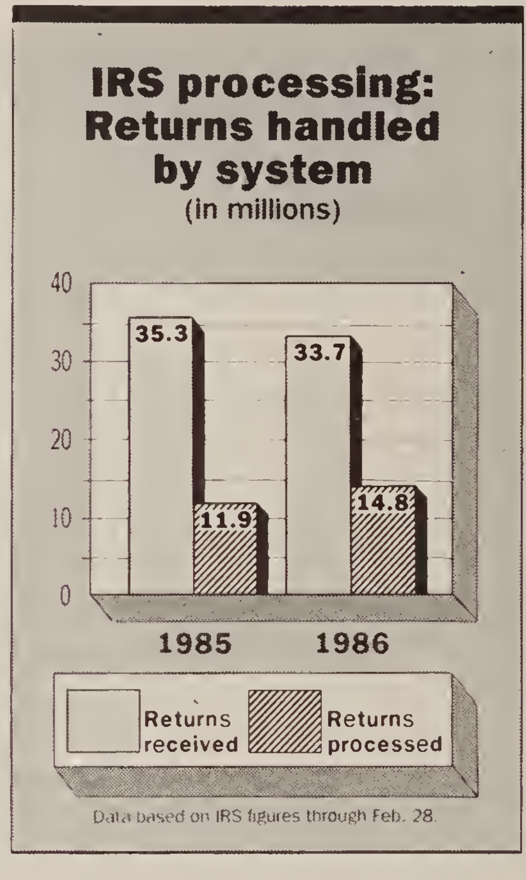
Therefore, programs that failed had to be run over again from the beginning instead of from checkpoints.

- There were numerous problems caused by data entry errors because, unlike the situation in prior years, the data was not key-verified; that is, the information was not keyed a second time by another clerk to ensure its accuracy.
- Service centers had problems attracting and keeping experienced data entry workers.

This problem was attributed to the lack of flexible hours, job stress resulting from performance standards and entry-level salaries that were often lower than those offered by local fast food restaurants.

— Mitch Betts

IRS processing: Returns handled by system
(in millions)



Data based on IRS figures through Feb. 28.

MITCHELL J. HAYES

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IRS systems need redesign

From page 1

slow Cobol programs and created a 24-hour command center to tackle the kinds of problems that caused the lengthy delays in tax processing last summer, IRS Commissioner Roscoe L. Egger Jr. said earlier this month.

"By all measurements, the extraordinary efforts made by IRS employees are paying off," Egger told a congressional panel.

Apparently aware that the system needs an overhaul, the IRS plans a major capacity enlargement program in June 1989, and it then plans to replace the system in the early 1990s with a totally redesigned one that is prepared for large-scale electronic filing of tax returns.

However, according to several investigative reports, the IRS needs to do a better job of planning and implementing major systems conversions to avoid repeating the 1985 fiasco, which occurred when the IRS replaced aging computers at its 10 service centers with Sperry Corp. 1184 multiprocessors and converted 1,500 programs from assembly language to structured Cobol [CW, April 15].

Staff investigators for the House Appropriations Committee, in a highly critical report, concluded: "The absence of a long-range DP plan has led the IRS into developing piecemeal, functionally oriented DP systems which appear to satisfy processing needs but which, in a larger sense, only serve to perpetuate capacity problems, ill-defined requirements and costly short-term fixes."

In the area of data communications, the EDS report said the agency lacks an overall sense of direction. "Thus far, communications happens instead of being planned," the investigators said.

Single focal point needed

Both the committee staff and the U.S. General Accounting Office (GAO) were critical of the IRS decision in December 1982 to abolish the Systems Development Office, which was created to design, implement and manage the ill-fated system replacement of last year. The GAO report said a single focal point in the IRS organization is needed to manage the system design and implementation if future conversions are to be brought on-line more smoothly than last year.

Moreover, all three reports said that before this year the IRS had a penchant for ignoring the advice of various studies and task forces on how to improve tax processing.

Consequently, the first recommendation made in the EDS report was as follows: "EDS strongly recommends that the IRS implement those changes identified in prior studies."

The IRS is now struggling to accomplish one of those recommendations. The GAO urged the agency to get some backup units for the aging Sperry 9040 front-end processors.

"Since the front-end processor is a critical link in the overall data processing system, the vendor has agreed to allocate two additional units for use in the event of an emergency," Commissioner Egger told Congress. The IRS has been trying to replace the front-end processors with new ones, but that contracting effort has been delayed by bidder protests.

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Interface '86 to spotlight ISDN, T1, SNA/X.25 offerings

By Elisabeth Horwitt

ATLANTA — The wideband, wide-area networking market is the prime target for many exhibitors at the Interface '86 conference held this week; the Integrated Services Digital Network (ISDN) standard is the catchphrase with which they hope to draw potential customers.

AT&T President James Olsen is set to launch the conference today with a keynote speech praising the ISDN standard as a giant step in AT&T's espoused strategy of providing wide- and local-area networking products in a "technological environment that is open and has a diversity of capabilities," an AT&T spokesman said.

"ISDN services here and now" is the message AT&T wants to get across at Interface, says Eric Kalin, AT&T district manager for integrated systems. "We want to show users that, while the ISDN interface details are not nailed down, the services — what ISDN can do for you — are available," Kalin adds. In one planned demonstration, an IBM 3270 terminal will simultaneously access a local AT&T 3B5 minicomputer through the resident AT&T System 75 private branch exchange or through an IBM mainframe in Denver via an AT&T Accunet T1.5 service link between the local PBX and Denver PBX..

'Working together for the first time'

"None of these products are new," Kalin admits, "but we're showing them working together for the first time and reassuring customers that they will have a nice, smooth, nondisruptive way to move these applications to ISDN when it does arrive." AT&T plans one concrete ISDN-related announcement: The Integrated System Network, a stand-alone data switch, will now support the primary ISDN interface that defines channel allocation for digital communications between switching systems and host computers.

Interface is the first show where AT&T will exhibit as one company instead of two, according to Kalin. Prior to the Second Computer Inquiry decision handed down last fall, AT&T subsidiaries AT&T Information Systems and AT&T Communications had to be at least an aisle away from each other.

"AT&T Communications couldn't even refer a modem shopper to AT&T Information Systems unless he asked specifically about AT&T modems," Kalin says. "Now we have all the networking solutions, including leased lines *and* modems, in one place."

Target private wide-area networking

Vendors whose equipment transmits data over 1.544M bit/sec. T1 links are set to showcase at Interface new monitoring and management tools that target private wide-area networking markets.

Paradyne Corp. is introducing an addition to its Analysis network management family as well as new modems and T1 offerings. International Data Sciences, Inc. is scheduled to display IBM Personal Computer AT-based network control and configuring system software. Timeplex, Inc. and Infinet, Inc. will also exhibit T1 management tools. Racal-Vadic, Inc. and Microcom, Inc. have offerings in the area of modem-based network monitoring and diagnostics.

Another perceived gap in the market that many vendors and exhibitors are eager to fill is the integration of IBM Systems Network Architecture (SNA) and X.25 packet-switched networking environments. Packet-switched value-added network services such as GTE Telenet Communications Corp.'s Telenet and Tymnet/McDonnell Douglas Network Systems Co.'s Tymnet are getting support for asynchronous-to-3270 connections and SNA-based transmission; General Electric Information Services Co. introduced 3270 access to its X.25 network, Mark Net, last week.

And for users that want to integrate their own SNA and X.25 networks, NCR Comten, Inc. has announced an X.25 interface for its line of IBM mainframe communications processors.

TOP OF THE NEWS

NEWS from page 1

with a rating not tied to CDC's operations.

■

IBM's Token-Ring network met its first-quarter delivery deadline, with general availability announced last week. No new Token-Ring products debuted, although many in the industry say they expect further announcements from IBM this spring.

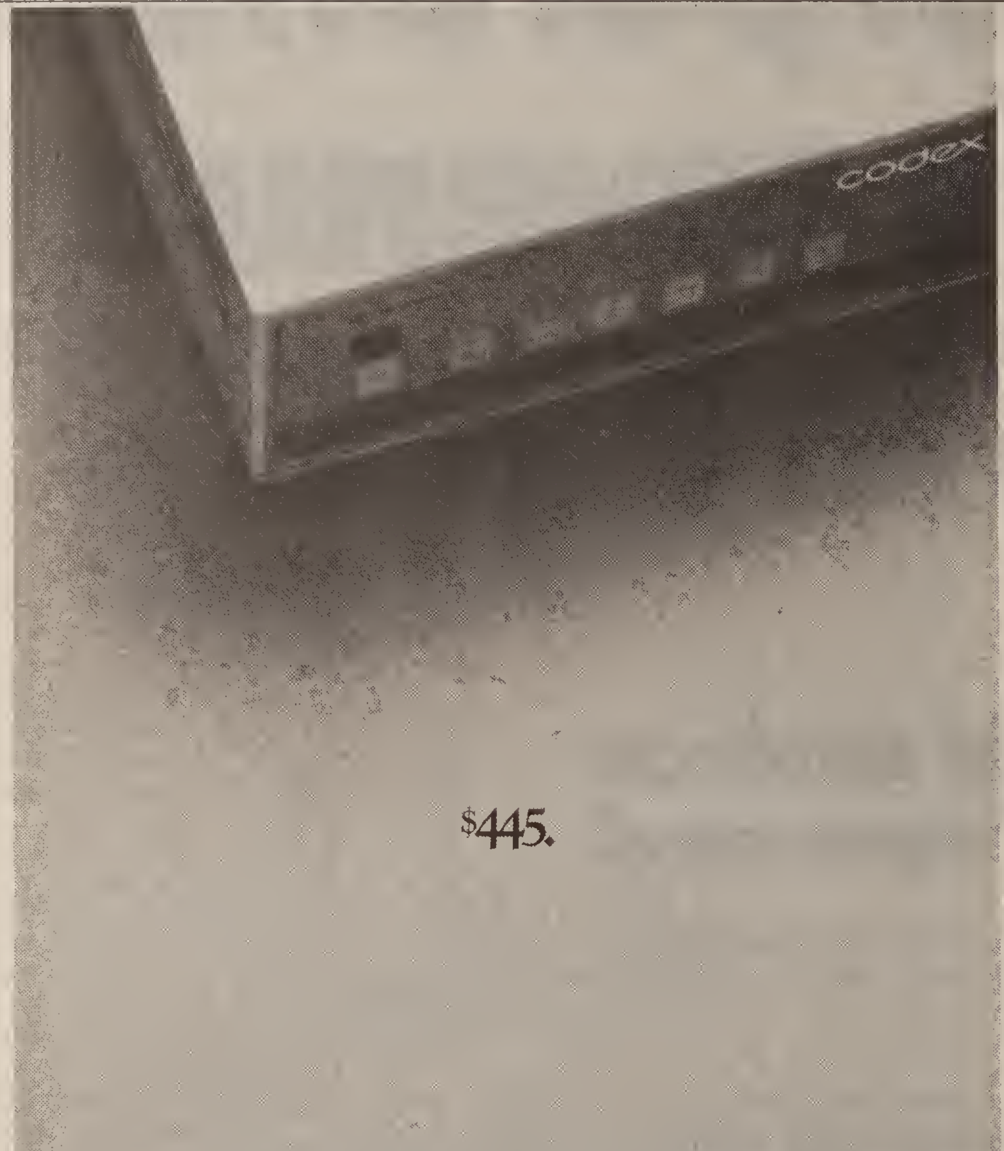
■

Apple Computer last week said it expects earnings for the second quarter, which ends this week, to be "substantially higher than expected." The company said it anticipates earnings in the range of $32 million, or 50 cents per share, for the quarter.

■

National Semiconductor last week reported a third-quarter loss of $32 million, or 38 cents per share, down from year-earlier profits of $1.5 million, or 2 cents per share. Revenue for the quarter was $328.9 million, down from $394.5 million.

■



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Run With The Leaders

Burroughs fills mainframe gap

From page 1

president for Burroughs corporate program management.

International Data Corp. analyst David Moschella said Burroughs "may have had a performance gap" in the range below the A 15.

Burroughs officials claimed an A 12, with a cycle time of 62.5 nsec, provides a 30% performance gain over a similarly configured Burroughs B7900 F in commercial environments and a 100% gain in scientific processing power. The B7900 series, which was introduced in 1983, will continue to be marketed, according to a Burroughs spokesman.

The B7900 performs an estimated 6.6 million instructions per second (MIPS) in commercial applications. Based on that rating, the A 12 would perform 8.6 MIPS, compared with 2 MIPS for the basic uniprocessor A 10 F system and 17.1 MIPS for the entry-level A 15 F.

The 8.6-MIPS rating would place the A 12 below the entry-level machine in IBM's new mainframe line, the 9.2-MIPS 3090 Model 150, and above the high-end system in IBM's intermediate line, the 6-MIPS 4381 Model 14. At a base price of $1.4 million for a 24M-byte system, the A 12 ranks slightly below IBM's $1.7 million 3090 Model 150.

The growth path through the A 12 and A 15 families will now allow users to increase their processing power to seven times the power of the A 12, to the 59.5-MIPS power of the four-processor A 15 N without physically replacing the system.

As with other members of the A series, the A 12 uses emitter-coupled logic and 256K-byte memory chips.

Memory expandable to 96M bytes

The A 12's basic memory is 24M bytes and is expandable in 24M-byte increments to 96M bytes. The system is available with up to 48 I/O channel paths for peripherals.

It runs a follow-up to Burroughs' Master Control Program operating system, MCP/AS, which was designed to allow a single program to address the computer's maximum memory. The A 12 is said to use 50% less space than the B7900 F because of the packaging of the CPU, memory and I/O processor in a single air-cooled cabinet occupying less than 10 square feet of floor space.

Burroughs officials said the A 12 operates all A series software, including Burroughs' Interpro Software Series and Logic and Information Network Compiler (LINC II). Interpro consists of six related software products developed to make mainframe applications as user-friendly as microcomputer applications, and LINC II is a fourth-generation application program and system generator, according to Burroughs.

Customer shipments are scheduled to begin in the third quarter of 1986.

Burroughs said a typical A 12 configuration will cost about $2 million, and an upgrade to an A 15 will cost $1.82 million. The A 10 cannot be field-upgraded to an A 12.

Ashton-Tate offers upgrade policy

By Peggy Watt

TORRANCE, Calif. — Ashton-Tate last week announced a corporate upgrade program for volume users of Dbase III Plus and Framework II that offers discount prices, extends the upgrade deadline and no longer requires return of earlier versions.

Under Ashton-Tate's program, registered users may upgrade a minimum of 25 copies of the same program for $75 each. Later upgrades of the same program, in increments of 10 to 24 copies, cost $90 each.

Ashton-Tate's program does not ask firms to return the original program disks or documentation of the older versions as long as an authorized company representative provides those serial numbers and signs an agreement stating that all earlier documentation and software will be destroyed upon upgrade.

Participating companies must be registered users of at least 25 copies of Ashton-Tate products. They have at least a year to upgrade their programs after a new version ships.

Single-copy upgrades range from $99 to $140.

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   - **31.** Manager/Supervisor Programming
   - **32.** Programmer/Methods Analyst
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   - **41.** Engineering/Scientific/ R&D/Technical Mgmt.
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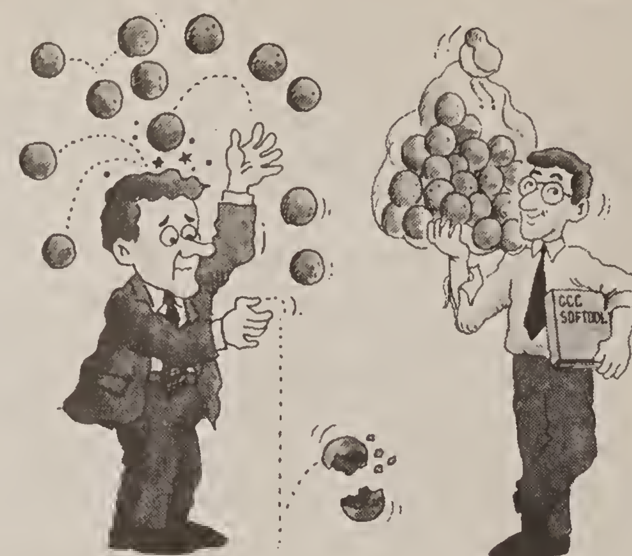

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HP enhances portable with more memory, applications

By Jeffry Beeler

CUPERTINO, Calif. — Hewlett-Packard Co. today is scheduled to enhance its laptop computer with a fourfold memory increase, additional applications packages, expanded communications capabilities and an amber display that improves the readability of the machine's output.

In a basic configuration, the upgraded version of HP's Portable Plus reportedly costs 7% to 13% less than similarly equipped models of the company's earlier laptop computer.

For a fee, the improved display, increased memory and all the other enhancements to the Portable Plus can be retrofitted to existing versions of the machine in 10 working days, said HP Product Manager Tina Luskey.

As part of today's announcement, HP also extended the warranty for its laptop computer from 90 days to one year, Luskey said. The extension applies to versions of the Portable Plus sold after April 1.

Among industry analysts, reaction to the enhancements was decidedly mixed. "The enhanced display provides a noticeable improvement in viewing quality and will help HP compete with suppliers of gas plasma and electroluminescent screens," according to Steve Hess, senior analyst with San Jose, Calif.-based Creative Strategies, Inc.

Hess also applauded the expanded main memory, which will allow the Portable Plus to support additional applications software. Together, the enhancements will keep HP technologically abreast of other laptop computer vendors. But the improvements are unlikely to enable the company to leapfrog its rivals.

To outdo competitors, HP must "provide some very specialized software" or otherwise "add even more value" to the micro than it already has, Hess said. He also voiced misgivings about the laptop's high cost.

Highlighting the latest enhancements to HP's laptop processor is a modified LCD that presents black characters against an amber background. The 25-line screen uses an improved crystal to provide three times better contrast — and a twofold wider viewing angle — than the Portable Plus' existing display, Luskey claimed.

The enhanced version of the HP laptop also reportedly provides a choice of either 256K-byte or 512K-byte basic configurations. If users elect to install main storage in all the slots that are ordinarily reserved for plug-in, read-only memory (ROM)-based software cartridges, the larger of the two versions can expand to 1.28M bytes, Luskey said.

In a third enhancement, the company has expanded the Portable Plus' application software support to include packages like Ashton-Tate's Multimate, Lotus Development Corp. Symphony and HP's own Executive Card Manager, a data base management program that simulates a Rolodex-brand card file.

On the data communications front, the company has enhanced its existing Reflection 1 product with an HP 2392 emulation feature that reportedly improves the portable micro's ability to exchange information with HP and other firms' minicomputers. Previously, Reflection 1 supported only HP 2622 emulation.

Other upgrades to the laptop's communications capabilities include the addition of products that allow the machine to communicate asynchronously with IBM mainframes.

In the wake of HP's latest enhancements, a 256K-byte and 512K-byte version of the Portable Plus cost $2,695 and $3,395, respectively. In the past, comparable configurations cost $2,890 and $3,880. HP has also trimmed the price of main memory increments by up to 29%. Existing versions of the Portable Plus can be upgraded to support the amber display and expanded memory for $350 and $1,100, respectively.

ADR, Ashton-Tate sign pact

By Eric Bender

PRINCETON, N.J. — Applied Data Research, Inc. and Ashton-Tate last week disclosed a development agreement designed to boost integration between the two vendors' products.

The agreement will permit direct information exchange between ADR's Datacom/DB mainframe data base management system and Ashton-Tate's Dbase and Framework packages, working through PC Datacom, ADR's microcomputer-based query and reporting package. The capability will be available in the second half of 1986, according to ADR President Martin Goetz.

Exchanging proprietary product information, the two companies also will consider new development efforts aimed at closer links between their offerings, Goetz said.

Each company will continue to market and support its products separately, and Goetz said that he did not expect the formation of a joint development team.

"We're just going to be looking together at how we can more tightly integrate the two systems," he said. "We'll be looking at [Ashton-Tate's Multimate word processing software] more closely, relative to our electronic mail facility, but primarily it will be Dbase and Framework.

"It's an important agreement for ADR; our customers that have Ashton-Tate products will be more comfortable," he said.

The agreement is ADR's first with a microcomputer software firm since making a deal three years ago with now-defunct Visicorp, Goetz said. He added that he expects ADR to make similar arrangements with other micro software suppliers.

In a prepared statement, Ashton-Tate President Edward Esber described the agreement as "a key element in our commitment to provide solutions for data sharing in the corporate marketplace."

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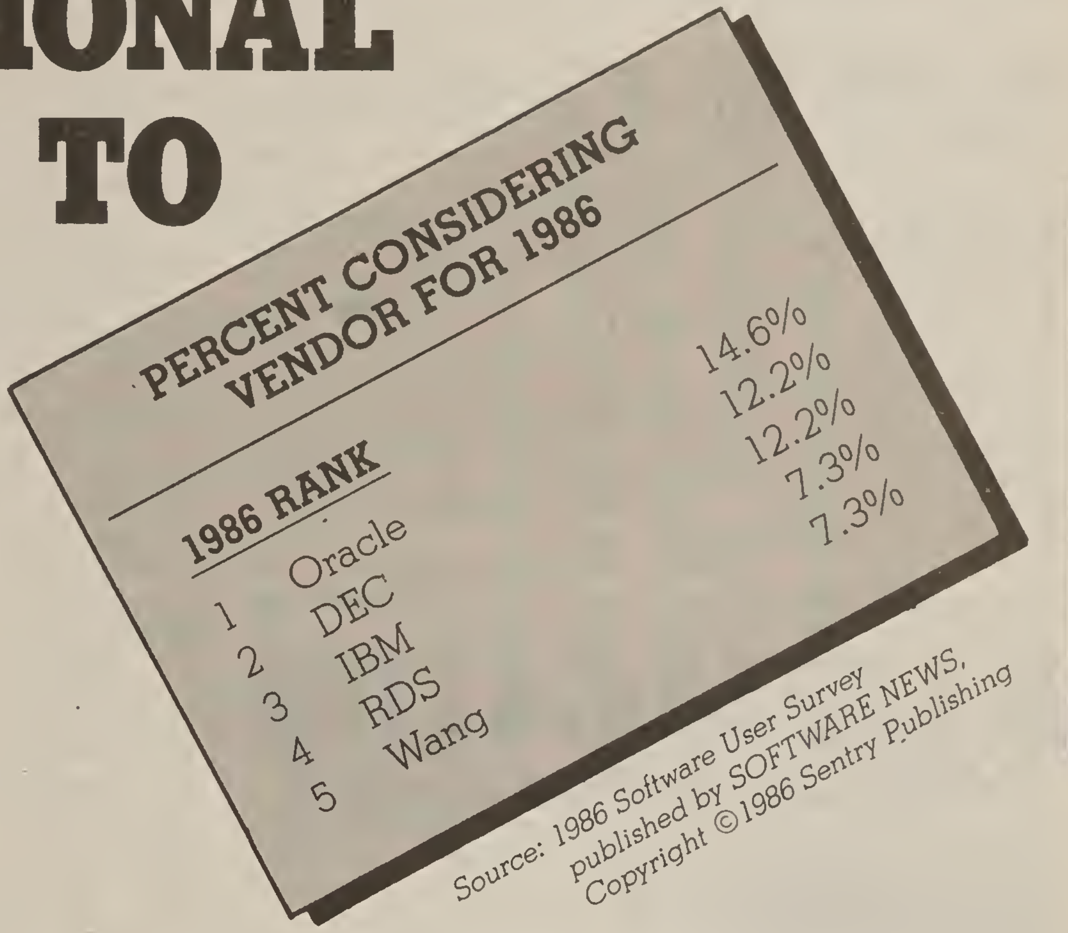

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2	DEC	12.2%
3	IBM	12.2%
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Convent Station, NJ	April 7
Dallas	April 1, May 6
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Denver	March 13, April 8, May 15
Des Moines	March 19
Detroit	March 13, April 8, May 7
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Ft. Worth	March 11
Houston	March 20, April 17, May 15
Huntsville	May 8
Indianapolis	March 11
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Kansas City	May 6
Lansing	March 11
Little Rock	May 13
Los Angeles	March 13, April 8, May 8
Lubbock	April 8
Milwaukee	May 21
Minneapolis	March 27
New Orleans	May 21
New York City	March 11, 19, April 9, 22, May 14
Newport Beach	March 18, May 13
Oklahoma City	April 15
Omaha	April 22
Orlando	April 9
Philadelphia	March 20
Phoenix	March 27
Portland	March 4, May 6
Rochester	March 18
Sacramento	May 13
St. Louis	April 9, May 14
Saginaw	April 24
Salt Lake City	April 3
San Antonio	April 22
San Diego	April 17
San Francisco	March 25, April 24
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Sunnyvale	March 11, April 10, May 8
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IBM shows X.400 links at Cebit

Big Blue affirms support for OSI

By Amiel Kornel
Computerworld News Service

HANNOVER, West Germany — In a cramped office at the Cebit computer trade fair in Hannover, IBM scientists showed major IBM customers an implementation of X.400-based message handling that links IBM equipment to the products of four European computer vendors. The technically sophisticated demonstration indicates a new twist in IBM's networking strategy.

IBM claimed to support the Open Systems Interconnect (OSI) model fully, which is advocated by the Geneva-based International Standards Organization. But skeptics claimed that IBM sees OSI as a threat to its own Systems Network Architecture. The Cebit X.400 demonstration, however, appears to reaffirm IBM's support for OSI.

In the demonstration, IBM equipment was linked to machines from Britain's International Computers, Ltd., France's Groupe Bull and West Germany's Siemens AG and Nixdorf Computer AG. The demonstration was organized after IBM expressed an interest in linking its Professional Office Support System machines to products of other manufacturers via X.400.

While a similar demo involving only International Computers, Siemens and Bull took place at last year's SICOB office automation trade show in Paris, IBM this year pushed the technical sophistication of its interconnection to greater lengths to accommodate the newcomer.

The Cebit demonstration went relatively unnoticed, due to limited promotion by its sponsors. Visitors to the display saw only International Computers, Siemens and Bull machines interchanging E-mail messages. To see the IBM and Nixdorf equipment in action, the visitors needed to inquire at another exhibition display in a different hall of the sprawling Cebit complex.

IBM's participation in the demonstration, in a rare application of the OSI model up to its seventh and highest level, was prepared at the U.S. computer titan's European Networking Center in Heidelberg, West Germany. The center is responsible for most of the Big Blue's research into OSI.

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Ethernet ties PCs to Unix

From page 1

enables users to run any Microsoft Corp. MS-DOS 3.1 application written for Netbios on an Excelan Ethernet network. Exos. 8051-02 programming library, priced at $595, is a TCP/IP-based set of routines that allows programmers to write transparent program-to-program communications applications between systems running MS-DOS 3.1 and University of California at Berkeley's Unix 4.2. For example, an Ashton-Tate Dbase III Plus could access data from a Unix data base. Both products will be available by the end of April.

Excelan manufactures Ethernet boards that link directly with the buses of a variety of hosts, including Digital Equipment Corp. VAXs, Sun Microsystems, Inc. workstations, NCR Corp. minicomputers and Sperry Corp. mainframes. "A lot of computer-aided design and engineering software vendors have entry-level products that run on the PC," said Excelan product manager Jay Weil. The new products, coupled with Excelan's high-speed networking boards, will enable users to edit designs and diagrams on PCs and then upload them to a host, he added. "That kind of application demands high-speeds: a typical CAD file is in the 1M-byte range."

"Excelan's announcements are a nice extension of its product line," said David Terrie, president of Newport Consulting of Boston. "The company has always served government, R&D and technical professionals and is just getting into the PC world. Adding Netbios to their network means that PC Network servers and applications can coexist with Unix applications, and technical professionals can use PCs to access files residing on a variety of Unix hosts," he said.

"Basically, we connect two types of hosts, DEC and Unix," said Subhash Bal, Excelan vice-president of marketing. "Both move slowly into the office world, the world of PCs. Up until now we only linked PCs to DEC and Unix as terminals."

AT&T and Microsoft also have MS-DOS-to-Unix links, but their target markets have little in common with Excelan's, Terrie said. Two years ago with its introduction of the 3B computer line, AT&T brought out a communications product that allowed MS-DOS personal computers to communicate with 3B hosts running Unix, either in terminal or file-transfer mode. But Terrie pointed out that AT&T's product only supports the limited installed base of 3B computers.

Microsoft recently came out with a networking product that permits data transfer between an MS-DOS system and computers running Xenix System V/286, Microsoft's licensed version of AT&T's Unix System V. Both computers must be running the same application software and communicate over Microsoft's local-area network, MS-Net. One advantage to running the same application on both systems is that the formatting of spreadsheets or graphics is left intact. Excelan's MS-DOS-to-Unix link delivers only flat ASCII files.

One limitation of the Microsoft product is that it is implemented on MS-Net, so that it will not automatically work with the growing ranks of applications written for IBM-supported Netbios. Terrie also expressed doubts as to whether Microsoft's MS-DOS-to-Xenix communications product will work with hosts running the original Unix V.

Terrie predicted that MS-DOS-to-Unix conversion products may eventually be made obsolete by the merging of the different operating systems. "IBM is about to introduce a new multitasking version of PC-DOS. Microsoft has a vested interest in extending the viability of Xenix by making it compatible with Unix V. Eventually multitasking, multiuser PC-DOS will be a subset of Xenix, which will be a subset of Unix V," he said.

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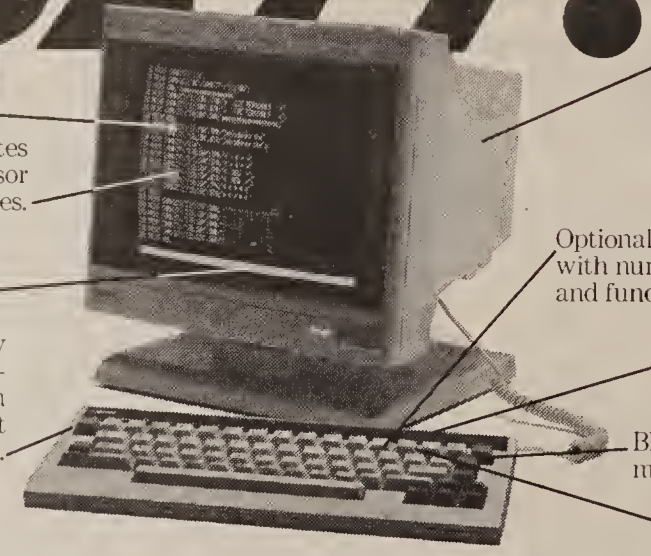
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OMB document sheds light on government's telecom plans

Investment strategy aims at avoiding risks

By Mitch Betts

WASHINGTON, D.C. — The investment philosophy of the nation's largest telecommunications customer — the federal government — is disclosed in a little-known document written by the president's Office of Management and Budget (OMB) and uncovered by Washington, D.C., researchers .

The 21-page document portrays the government as facing the troublesome and fast-changing world of telecommunications with a strategy designed to reduce risks. For example, the OMB said budget examiners should be wary of agency proposals for leading-edge technologies because of a high risk of failure.

To get budget approval for a telecommunications investment, government managers must show that the proposal is tied to a good strategic plan, uses only proven technology and favors public networks over dedicated lines, according to the document.

'OMB Opens its Kimono'

International Data Corp.'s (IDC) Washington Division, located in nearby McLean, Va., recently obtained the internal OMB document and published it in a bulletin titled "OMB Opens its Kimono." Intended as guidance to OMB budget examiners on how to scrutinize agency telecommunications proposals, the checklist provides candid insights into the OMB's management philosophy.

The OMB began the checklist by requiring that proposals be tied to a telecommunications plan because "muddling through is not a planning technique." The plan must be based on the agency's mission, not the views of the information resources manager, and it must be realistic.

Furthermore, the proposal should be based on an explicit needs assessment that includes the serious participation of users.

OMB also required a cost-benefit analysis, including study of such unquantifiable issues as security and analysis of future price trends for services and equipment. There is a big risk that agencies will fail to include the costs of managing the network, user support and administration since these responsibilities were once handled by the Bell system, the document said.

The guidance document said budget examiners should be wary of proposals that depend on projected benefits that will occur more than five years in the future. "Why should we have confidence in those benefit estimates? Five years in this industry is a long time."

In the end, the government office summarized its budget strategy in several general principles:

- Proposals should not commit the agency or the government to a specific telecommunications strategy that cannot be modified or that can be modified only at a very high cost.
- Agencies should use proven technologies and common industry standards, and proposals should be incremental, building on past experience.
- Agencies should use commercial services or join existing multiuser networks rather than dedicated private networks for standarized offerings such as the packet-switched data services offered by common carriers.
- Agencies should always complete the design of a system before beginning implementation because "it can be very costly to implement a system as it is being designed."
- Agencies should have the "right stuff," the in-house technical expertise, to implement the strategies they propose.
- Agencies should have a procurement strategy that exploits competition to reduce government costs and evaluates the implications of various lease and purchase options.

IDC's bulletin said that, with the OMB taking a more active role in information management, the principles found in the telecommunications document may well find their way into OMB guidance documents for other information technology budget requests.

CORRECTIONS

The annual maintenance fee for the Sterling Software, Inc. Dylakor Division's Dyl-Inquiry is 15% of the purchase price [CW, Dec. 30/Jan. 6].

The U.S. Department of Defense's terminal handling program [CW, Jan. 13] is named Telnet. It is not GTE Telenet Communications Corp.'s Telenet.

Communications Satellite Corp. (Comsat) [CW, Jan. 13] is the U.S. signatory to Intelsat and is a publicly held corporation traded on the New York Stock Exchange. Neither Comsat nor Intelsat have any financial support from the U.S. government.

Honeywell, Inc.'s GCOS 6 MOD 400 Release 4 [CW, Feb. 3] runs on Honeywell's DPS 6/22 minicomputer.

The Prime Computer, Inc. two-dimensional, two-seat configuration based on the company's 2350 system costs $47,310 per seat and includes a Prime PT200 console [CW, Feb. 3].

The correct name of IBM's dominant data base management system is IMS Full Function [CW, Feb. 10].

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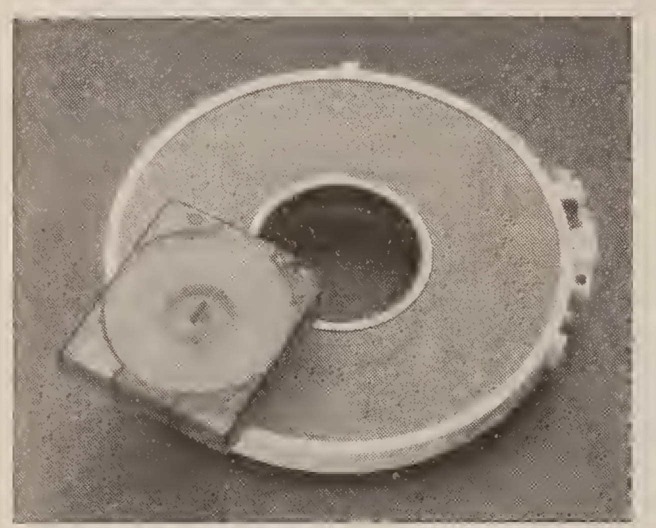
IBM leads pack with cartridge

From page 1

traditional 10½-in. reel system, is difficult to emulate, however. Because IBM uses an 18-track tape instead of conventional 9-track tape and a difficult-to-copy chromium dioxide medium that causes a lot of head wear, PCM development of the product could take a total of two years from the beginning of the effort, according to Dave Vellante, a storage analyst with International Data Corp., a market research company that is based in Framingham, Mass.



Converting from reel to cartridge technology is said to simplify tape handling.

IBM has already built an impressive lead over PCMs, Vellante says. In 1985, approximately 8,000 of the 3480 cartridge systems were shipped, compared with 12,000 PCM shipments of 3420-type units. However, since the 3480 comes packaged with two drives per box, it actually surpassed the 3420 types in total number of units shipped for the year, he says.

After a hectic dash to catch up with IBM, the PCM offerings may be obsolete by the time they are released. PCMs have had difficulties coming up with the 18-track 3480 tape system, and IBM is now rumored to be working on a 36-track tape, Vallente says.

"IBM is setting a standard of tape media interchange, and non-IBM vendors will have to offer similar products," adds Jim Moore, vice-president and director of the Computer Storage Industry Service at Dataquest, Inc. in San Jose, Calif. Some of the long-awaited PCM products should surface by the end of 1986, he adds. PCM versions, in Moore's view, must either be cheaper than IBM's or include features such as an automatic cartridge loader to make them competitive with those from Big Blue.

The earliest challenge in the 3480 arena so far will be introduced in June 1986. A young Longmont, Colo., company founded by former Storage Technology Corp. (STC) engineers will bring out an OEM version of a 3480-type device [CW, March 10]. Although the Aspen Peripherals Corp. product does not come with the necessary controllers for hooking up to any particular vendor's mainframe, the company claims it is totally IBM media-compatible.

After IBM introduced its 3480, STC was among the first to announce its intention to release a 3480 clone. The company will do so in the second half of 1986, and the device — code-named Cimmaron — will begin shipping in 1987, says Joseph Beal, director of worldwide product marketing for STC. An automatic loader feature is only one of the features that will make the STC model different from IBM's 3480, Beal adds. To entice users to wait for the device, the company will show it to prospective customers so they will know what they are waiting for.

A manager of a 40,000-reel Midwestern installation has examined the STC device and says it is a library unit, whereas IBM's 3480 is just a device replacement. Asking not to be named because of a nondisclosure agreement he signed, the manager says he is willing to wait and examine PCM products to see if his company can obtain a better device. He is hesitant about spending $1 million to convert to IBM 3480s only to obtain a different method of backup and archiving.

Large systems users will probably have to wade through a variety of options before they decide on which cartridge device to use in the not-so-distant future.

Memorex Corp. President Philip Dauber says his company's 3480 device should be ready in about 12 months, give or take a quarter. He declined to provide any information on the features of the device.

Memorex, like some other PCMs, is offering an interim device. The company announced in February that it has begun shipping its 6520 tape-cache processor, a performance enhancing addition to its reel-to-reel products, with a data compaction feature. The company claims that the 6520 is a low-cost alternative to the IBM 3480 cartridge tape subsystem.

> ”
>
> ***When the PCMs finally deliver cartridge alternatives, potential customers will have to pay attention to several factors. IBM compatibility is key, followed by price advantages and additional features.***

The interim system was designed to hold off users until Memorex's 3480-type cartridge product is in place.

To convince customers to wait, the company offers a financing package whereby users of the Memorex 3280 tape subsystem with or without

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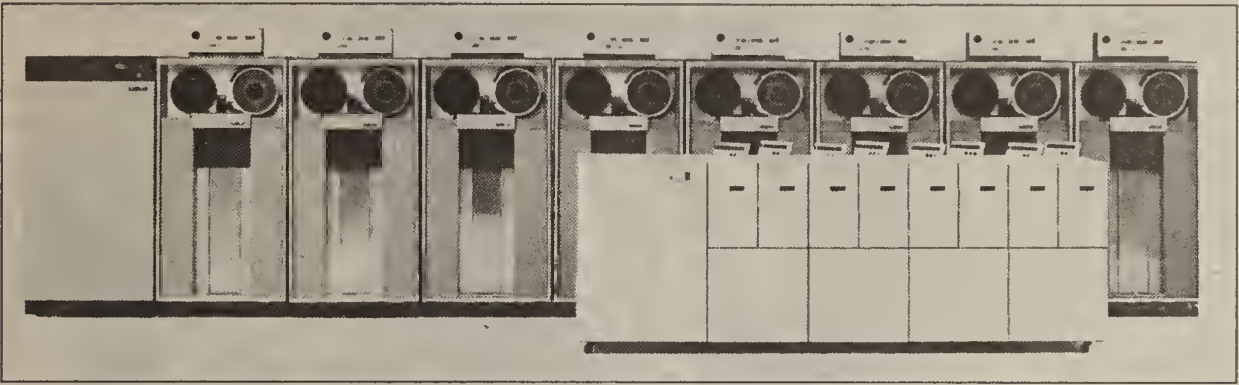
a 6520 tape-cache processor can upgrade to a Memorex 3480-type device after 18 to 24 months.

National Advanced Systems Corp. (NAS), the plug-compatible mainframe manufacturing division of National Semiconductor Corp., is not attempting to develop its own 3480-type device, preferring to wait for Japanese vendor Hitachi Ltd. to announce its version. "We know Hitachi is in development, but we are not at liberty to discuss when that [version] will be ready," says NAS spokesman Chuck Molloy. Analysts say that device probably will not be released before 1987. NAS is not considering offering an interim product like Memorex's, Molloy says.


The IBM 3480 vs. the 3420: Eight drives with a controller

The other major PCM, Amdahl Corp., will sell whatever tape cartridge product Fujitsu Ltd. comes up with, an Amdahl spokesman says. "It's real hard to say when Fujitsu will release a 3480 type," according to the spokesman, who said that release is not imminent. Amdahl does not at this time sell a reel-to-reel device, nor does it intend to get into that business now, the spokesman says.

When the PCMs finally deliver cartridge alternatives, potential customers will have to pay attention to several factors, says Raymond C. Freeman Jr. of Freeman Associates in Santa Barbara, Calif., a publisher of storage newsletters and reports. IBM compatibility is the key factor a customer should look for, Freeman says, followed by price advantages and additional features.

He advises storage managers to ensure that the PCM versions they buy accept the same media as does an IBM 3480, record in the same manner as the 3480 and have the ability to use cartridge tapes that have been recorded on IBM cartridge devices.

One of the important features to watch for is an automatic tape loader, Vellante says, the feature STC claims it will provide. "There is absolutely no clue as to when IBM will offer an autoloader," Vellante adds.

But Canon's Kouga cautions that automatic loader is a broad term. "If I decided to buy that feature, my purchase would depend on how automatic the loader was," he says.

The Midwestern manager, however, says automatic loading is an important feature for his operation. "Tapes are very manually intensive, and people would rather not hang them," he says.

Prudential's Sieg would like to see a better display for mounting tapes. "The display could be larger and easier to read," he adds. Sieg agrees that the automatic loader is of nebulous value. "It wouldn't make a great difference to us," he says. 'We don't have a series of tapes for one particular job, and the way I understand the autoloader, you would have to insert the series into it."

Users should also consider the option of staying with reels, Vellante advises. The used tape market, which dipped dramatically when sales of the 3480s started to rise, has stabilized, and the value of used drives is going up. Reel-to-reel devices can still perform some functions the cartridges cannot, Vellante says. For example, the vacuum-column or tension-driven reels can perform better in applications that need a lot of start/stop action; they can be used for logging and for transport.

IBM, which no longer manufactures the 3420 but does still sell from inventory, recently announced its 3422 reel-to-reel device [CW, March 10], which is an updated version of the 16-year-old 3420. The unit is targeted to large-system users who have not yet elected to go with the 3480s and to satisfy the mid-size systems market. The company is aware that the marketplace for reels has not disappeared, observers say.

Prudential still uses two reel devices for microfiche operations and for the diagnostics IBM performs on its IBM 3090 mainframe, Sieg says.

Canon keeps some of its 3420 reel devices for its microfiche tape applications and for transport reasons, Kouga says. IBM took back many of Canon's older 3420 devices, and Canon had about 5,000 of its old reel tapes degaussed and sold by Erase It Corp. in New York.

About 80% of users will have 3480-type cartridges eventually, Vellante says, but not for several years.

No two users make the conversion to 3480s in quite the same manner, Freeman says. Some mainframe shops have converted almost all of their old reel-to-reel installations to cartridge installations in one sweep. Others have decided to convert on an as-used basis — moving jobs from reels to cartriges as they are used. Still others have decided to put only new jobs on cartridges.

"It is difficult to say how big a project converting is," Freeman says. But all cartridge users keep at least a string of conventional reel-to-reel tape devices for service and transport purposes, he adds.

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VIEWPOINT

EDITORIAL

War of the chips: Vendors vs. users

The semiconductor industry is back in the news, rejoicing at the latest U.S. Department of Commerce ruling that Japanese chip makers are selling products at below their production costs. This time the feds ruled against vendors of both erasable programmable read-only memory chips and 256K-byte dynamic random-access memory chips and their new 1M-bit cousins; late last year vendors of 64K-byte RAM chips got the same treatment.

The semiconductor industry and its few supporters would have us believe that these rulings confirm its curious protectionist logic: That industry ills have been almost singlehandedly caused by the Japanese — not by the cyclic nature of the business, not by the record-high dollar, not by its historic tendency to overspend on capacity while demand slackens, not by inevitable learning curve price drops, not by overexpansion based on faulty business projections, not by U.S. manufacturing inefficiencies.

No, the U.S. semiconductor industry has quite a different message for American consumers, concludes Scott Palmer, director of the Washington, D.C.-based Taxpayers' Foundation, in his recent article in the *Wall Street Journal*: "It would like them, please, to stop buying all those inexpensive computer chips from the Japanese and instead buy more expensive U.S.-made chips."

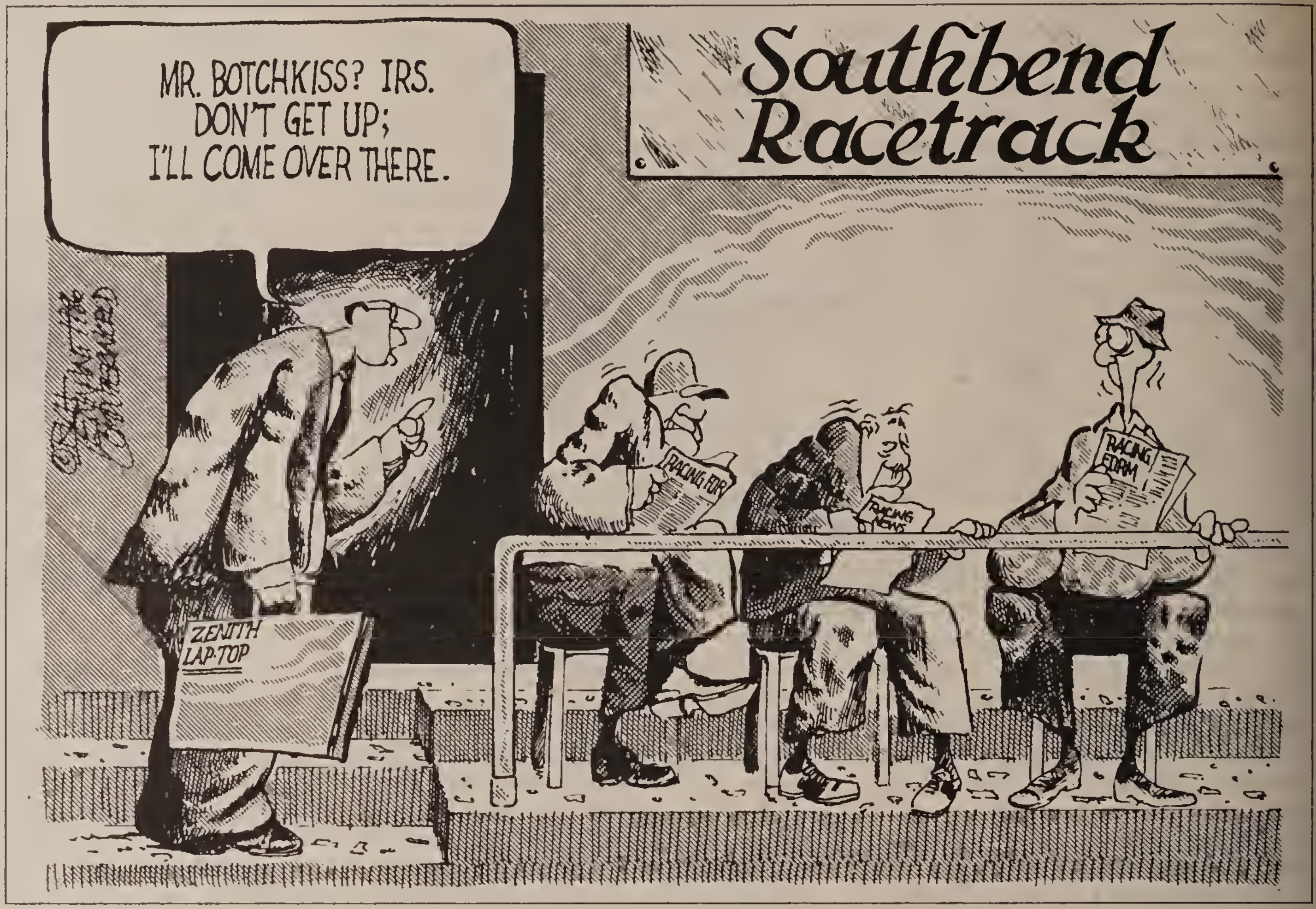
In this market battle, it is clearly the makers and buyers of computer products who stand to lose. Already the dumping charges — which U.S. semiconductor makers translate as winning — have meant 20% price hikes on some chips and, therefore, price hikes all the way down the line from individual personal computer boards to the largest of mainframes.

Winning this so-called trade war, like winning any war in a world of intertwined relationships, invites retaliation. To restrain trade is to invite retaliation, and the potential for such retaliation rightly worries the computer industry, an industry that depends on foreign business more than most. As a result, semiconductor makers have few supporters in other segments of the industry.

A few of the chip makers may have begun to see their folly. Last week's unprecedented informal meeting between representatives of the U.S. and Japan semiconductor industries — though it was initiated by Sony Corp.'s Akio Morita and seemed to produce few tangible results — was a step. So, too, was the recent move by Advanced Micro Devices, Inc. Chairman Jerry Sanders, who a few months earlier was berating the Japanese as looters, to enter into a joint technology agreement with Sony that will allow the companies to exchange chip designs and to market resulting products worldwide.

All this is not to ignore the chip makers' problems: They do, in fact, have the right to redress. They deserve redress, however, not from the Japanese but from from a government whose policies saddle them with nearly insurmountable burdens — for example, capital costs three times those of Japanese firms.

We can do no better than support Mr. Palmer's conclusions: "Quick fixes, political rhetoric and protection against imports will not cure what ails the U.S. semiconductor industry. Only a fundamental reassessment of America's policies toward business will ultimately succeed."



LETTERS TO THE EDITOR

Price cutting counterproductive

In reference to the recent article "Price cuts may prove costly" [CW, March 17] regarding price cutting in the software industry, I would like to state my position on the matter. Generally, price cutting as a marketing tactic is counterproductive.

- Even when prices are reduced, a company most often does not get the business anyway.
- Companies usually buy what they feel is the best software from the company they respect, regardless of the price.
- Companies that buy strictly on price are foolish because a software product is only as good as the company behind it. In the long run, they will pay the price in lack of support or lack of enhancements from the software company.

In the long term, companies want to associate themselves in a partnership arrangement and are willing to pay a fair price for software-related services rendered. Most companies consider it a good investment.

John J. Cullinane
Chairman
Cullinet Software, Inc.

Debating systems analyst's role

The article "Systems analyst wanted: No programmers need apply" [CW, Feb. 17] gives a bit of hope that a small awakening is starting to take place.

The newspapers here in the Dallas area also carry ads like those from the *Boston Globe* that were mentioned in the article. The insistence that a systems analyst also be a programmer is prevalent industrywide. It is not just a coincidence that the most popular (widely advertised) position is that of the analyst/programmer. Combined into one job are all the factors for systems analyst and programmer, each of which requires full efforts from the participants, which means that what is desired is two people in one.

These two disciplines do not conjoin or reinforce each other, since the tasks of each are so spearate they never can merge no matter how hard DP managers try to force them to do so.

Indeed the job of analyst/programmer has been a misfit from the start. Who is the truly versatile person who loves to do systems analysis and program? Are we to believe that such people who would have to be neutral in motivation towards each side of the analyst/programmer actually exist?

Surely when choices have to be made, the so-called truly versatile person leans more heavily towards one than the other.

It has been argued — wrongly — by DP managers that when the systems analyst is also required to do his own programming there is no chance for any misinterpretation of the specifications by other programmers; hence, a superior product results. Thus systems analysts must also know programming. But what kind of product do you produce when the systems analyst is at best only lukewarm about programming tasks?

The awakening from mismanagement falsities such as those surrounding the analyst/programmer job in spite of all facts to the contrary will be an uphill struggle. Falsities have a way of becoming solidified into truths after being propagated for 25 years. It sounds as though the author is making a solid effort to assist in the awakening process.

Perhaps there are a few hundred, a few thousand more who feel the same. The field of data processing desperately needs all such efforts, because mismanagement is a plague upon the DP industry. Only efforts such as the author's will (hopefully) begin to expose these falsities and thus lead to corrective steps in the industry.

John Callahan
Author and DP consultant

■

The article "Systems analyst wanted: No programmers need apply" [CW, Feb. 17] needs replying to.

The only likely result from following the author's recommendations would be that the programmers would have to do a large part of the work once done by systems analysts. It's true that business experience in the designated field is very beneficial, maybe even vital, to a systems analyst. But it is absurd to imagine that the systems analyst's job does not require a large amount of computer programming knowledge — not skill, since the systems analyst could have been a relatively lousy programmer. Still, the best ones will surely come up from those ranks and not from the business side of the corporation.

Why? First of all, to imagine that the systems analyst will ever learn as much about the business

See **DEBATING** page 22

WEEKLY.

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

IBM users confused by net reversal

'Get tough,' DPers urged

Apple push on for more system links

Improved Mac, IBM, DEC compatibility is targeted

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   - 70. Medical/Legal/Accounting/Mgmt
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3317-8612

VIEWPOINT

Great performances in systems measurement

By EFREM G. MALLACH

The systems performance measurement industry has come a long way since Boole & Babbage, Inc. pioneered software monitors in late 1968. We know how to measure every useful aspect of a computer's behavior and several useless ones as well. Standard operating system software includes measurement and analysis capabilities that were the domain of specialized tools a decade ago. The specialized tools have kept pace by advancing even further.

Yet the question still nags: With all this information at our fingertips, what use are we making of it?

The answer, in too many cases, is not very much.

This raises three more questions: Is that state of affairs reasonable? If not, why does it happen? And what, if anything, should managers do about it?

MANAGEMENT MATRIX

> ”
>
> ***Do top managers let MIS get away with inefficiencies that would never be tolerated elsewhere because computers are perceived as inscrutable by mere mortals? Often, yes.***

No, this situation is not reasonable. Independent performance measurement firms like Boole & Babbage do about $150 million in business each year — this estimate is from Jack van Kinsbergen, Boole & Babbage senior vice-president and chief technical officer. Performance measurement products and services from computer systems vendors add a comparable amount. With total user DP spending of about $100 billion per year, about one dollar in 300 is spent in this area. Even if much more than 1/300th of user staff hours are spent on performance issues, the total is still low. Compared to computers, there is no other corporate resource on which managers spend so much money and then concern themselves so little with how the resource is utilized.

At the overall corporate level, far more than one of every 300 revenue dollars is spent on accounting (measuring financial performance), analyzing the reasons for problems and planning improvements. The same is true of manufacturing, the motor pool and the mail room. Why should computers be exempt?

It is true that some data processing shops, especially smaller ones, are struggling so hard to stay afloat that thoughts of trimming the sails and fine-tuning the course are put aside.

But even beyond that point, fewer installations are measuring performance and tuning it than ought to be. Fewer yet are using this information for prediction and planning. If you are among the select group that is doing these things, congratulations. There are far too few of you around.

Why is this group so small? Have the high priests of MIS convinced general management that no improvements are possible? Not likely.

Are the performance analysis arts so arcane that only the elite can benefit from these tools? Maybe once, but not for years.

Do top managers let MIS get away with inefficiencies that would never be tolerated elsewhere because computers are perceived as inscrutable by mere mortals? Often, yes.

Fortunately, managers can correct this situation without becoming computer experts. If you are a top manager with DP funding responsibility, take these three easy steps:

- Put your DP chief on notice that future expansion requests will be subject to the same justification that is demanded of every part of the organization — that current equipment is fully and efficiently utilized, that alternatives for expansion have been analyzed objectively and that the cost-effective solution is recommended.
- Insist that DP use state-of-the-art tools to analyze system performance. Let your DP crew pick the tools they prefer. Ask to see performance reports, and get a nontechnical interpretation of what they mean. If you staff can't provide this interpretation, most tool vendors can.
- Give DP the support it needs to do this. Performance analysis tools are not free. Even if you start with your operating system resource management routines, the people that interpret them and take advantage of the results are not free. But both the tools and the people pay for themselves many times over.

Analysis not whole answer

Performance analysis is not the whole answer. It addresses efficiency, not effectiveness. It will help you optimize your IBM 3081 configuration. It will not tell you if your 3081 should be running different applications or if you should replace it with 20 supermicros.

Effectiveness is a broader issue that should also be addressed. A month from now, though, most companies will do the same things they are doing this month, and in about the same way. Improved efficiency is the most they can ask for in the short run.

Even in the long run, as strategic effectiveness issues are addressed, efficiency considerations should remain in the picture.

Mallach is associate professor of computer science at the Boston College School of Management and a consultant to top managers of vendor and user organizations.

The art of managing decision support tools

By PHILIP N. SUSSMAN

The evolution of decision support systems — computer applications that help managers responsible for making and implementing decisions — from a mainframe to a microcomputer environment has created many issues for company managers. While the issues are diverse and often troublesome, they all can be understood in terms of four underlying themes. These themes, are as follows:

- What human resources do we have?
- What information resources do we have?
- What technology should we use?
- How and where should we establish control?

READER'S PLATFORM

The first issue in the human resources area is that the people most knowledgeable about microcomputer decision support systems usually exist outside of the established information systems organization. This is true whether or not people in information systems are willing to face it. The result of having this expertise external to the management information systems department is user independence from the programming and information systems organization.

If I were counseling the director of MIS on how to deal with this situation, I would suggest that the MIS department change its role from the care and feeding of large computers to the coaching and support of end users.

Managers are one group of users who are becoming increasingly comfortable with computer technology, thanks to personal computers. Decision support systems have been around since at least the mid-1970s. However, the systems did not really get into the executive office until personal computers were developed. Executives who did not want a computer terminal in their office now regard it as a status symbol to have a personal computer.

However, one old bugaboo remains, which I have whimsically referred to as the lack of "executive keyboard skills," otherwise known as typing.

It's a very serious issue. Managers can certainly use the computer without knowing how to type, but if they are spending a significant amount of time at the computer, they ought to have some kind of keyboard training.

Another important point about managers and computers: If you have data bases and models widely available and give users the ability to produce financial reports as soon as the books are closed, a senior manager in the organization who has access to the system could get at the information and produce an analysis before it was presented by subordinates. While this access may greatly benefit the organization, it also may cause subordinates some discomfort until they adjust to the new information flow.

One is more apt to find this behavior in places such as banks, insurance companies and brokerage houses, where executives are geared to a terminal environment and are used to getting right onto systems to retrieve various types of information.

In spite of projections to the contrary, there will not be an evolution to a workplace with significantly fewer computer intermediaries — those who use models and data bases to produce analyses that are presented to someone else. However, there will be an evolution to a workplace with significantly fewer middle managers.

This job attrition must be faced by managers concerned with companywide effects of computerization. In aggregate, the computers that are coming into companies are very costly when the total costs, including workstation hookup and software, are considered.

How can companies justify these expenses? The decisions made by most individuals who have computers will probably not increase in value sufficient to justify the machines. The most likely way that companies will achieve a payback is by requiring fewer people for the same level of business activity. This, in fact, is what is happening to many large companies today.

Turning to the information resources area, one first must examine the relationship and interface between micrcomputers and existing information systems. Generally, there is a great deal of corporate data on existing computers that users should be able to access. However, at present, many systems cannot communicate with each other, thus reducing the opportunities for shared applications.

A second issue involves an information resource that is often overlooked — competitive intelligence. If you really want a decision support system to help in decision making, it must contain information that is critical to the decision. Most critical decisions are based on information about competitors and the marketplace and not on historical accounting information.

Competitive information is present within your company. The sales representatives know what is happening in the marketplace. Why hasn't this information been put on a computer? Because most of the mainframe systems automate things that are intrinsically clerical. It should be there, but it will need a special push from systems designers and enlightened users to get it on mainframes.

The root cause of much of the confusion about technology options is

See **DECISION** page 18

Sussman is an internal consultant for International Paper Co. in the business development division. He was recently named project manager for the division's new information system.

Decision support tools

From page 17

fast-moving hardware technology, for example, in the area of user interfaces. The keyboard has been the traditional interface, but it is under attack from the touch screen and the mouse. The ultimate user interface is voice recognition, an area where firms are making rapid advances.

A final concern to the hardware manager is the possible degradation of mainframe response time caused by numerous microcomputer queries.

Integrated software and graphics have been areas of particular attention for software designers. The upcoming area that is creating a great deal of excitement is artificial intelligence. The first major application for artificial intelligence will probably be in one of the mass data base businesses such as banks, insurance or finance companies.

Decision support systems are one of the tools used by managers to implement office automation and thus enhance office productivity. Enhancing office productivity is very difficult to do because office workers have a work environment that is very discretionary. People do things in different ways at different times.

Plan that prompts thinking

The key to automating an office is developing a plan that prompts some thinking beyond what each manager could use to help his work. By just throwing computers here and there, by buying software packages and responding to what each individual user wants, you don't necessarily improve productivity; you only do that through some type of organized effort.

This effort may result, for example, in the establishment of a mainframe decision support software package as the vehicle through which corporate information is made available to company managers. Computer users in the company may still be free to choose software for their own personal computers, but will need to develop an interface to the corporate systems in order to get at the data in an automated fashion.

The last set of technology issues has to do with management. As mainframes become the data utilities to microcomputers, the importance of data security and integrity grows. Also of concern are file backup, local service and the hidden costs of computers — everying from recruiting and training to maintenance and program conversions.

Another difficult question facing company managers in regard to decision support systems is control — of hardware, software and the development and installation of decision support systems.

This MIS dilemma has been referred to as the plight of the sorcerer's apprentice. Once you let the technology out of the bag and people start using it, how do you stop it?

The answer is you can't stop it. In fact, the infiltration and proliferation of devices is impossible to control, and yet there is a dangerous potential for increasing overhead through uncontrolled investment in data processing.

The areas where control or coordination are needed are much broader than commonly thought.

If a company does not have an explicit policy for coordinating these areas, it is implicitly saying to the employees, "You are free to do whatever you want." While this may be the best way to encourage early innovators in the company, the additional costs of this laissez-faire approach grow rapidly as additional users come on-line.

What then can a company do to help its user community? First, there should certainly be an information center, where users can go for advice and assistance in writing their own computer applications. Second, all computer hardware and software should be purchased centrally. Third, vendor relationships should be limited to those offering best value, based upon both price and service. Fourth, the company should consider giving corporate commitments for volume discounts and, if feasible, set up a company store. Fifth, service contracts should be negotiated on a centralized basis.

All these are standard, straightforward actions that a company can take to benefit its user community. Once these administrative actions have been taken, the company can then get involved with the more substantive issues such as what decision support systems are needed and who will build and support them.

The real payoffs from decision support systems come not from simply installing a system within a given organization, but from looking at that organization from the ground up. What decisions have to be made? Who should make them? What information does he or she need? Only by taking this fundamental approach to work design can decision support systems achieve their full potential.

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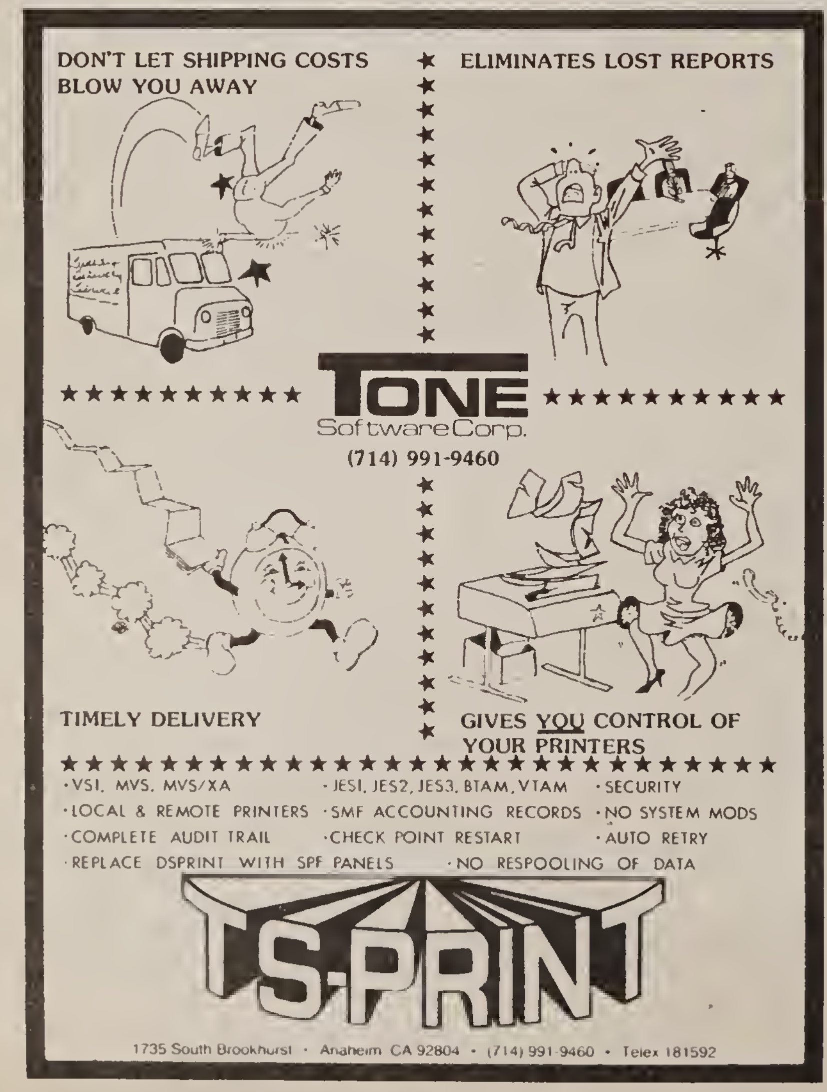
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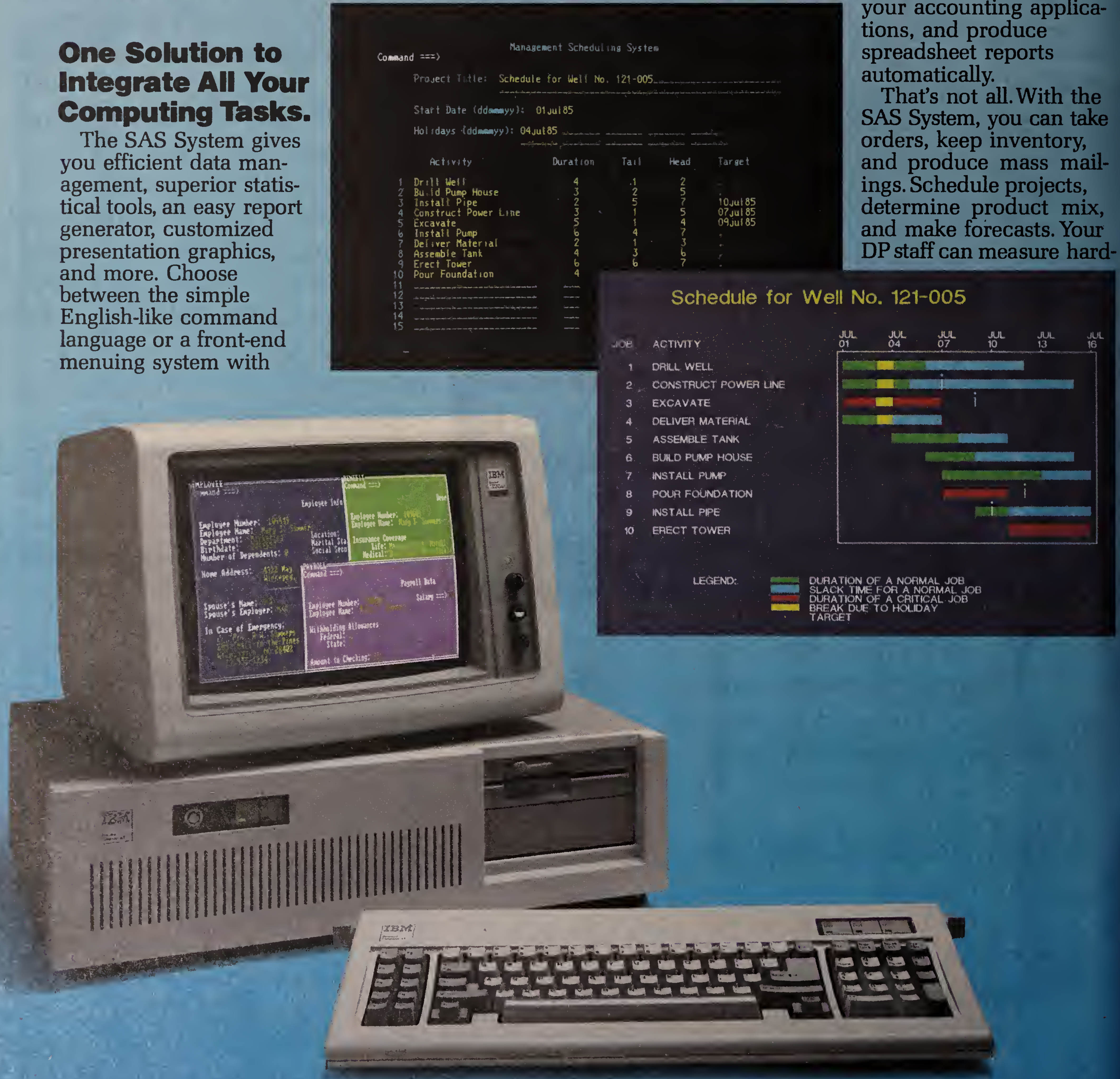

```
                         Management Scheduling System
Command ===>

     Project Title:  Schedule for Well No. 121-005

     Start Date (ddmmmyy):  01Jul85

     Holidays (ddmmmyy): 04Jul85

        Activity                    Duration     Tail     Head     Target

   1  Drill Well                        4          1        2        .
   2  Build Pump House                  3          2        5        .
   3  Install Pipe                      2          5        7      10Jul85
   4  Construct Power Line              3          1        5      07Jul85
   5  Excavate                          5          1        4      09Jul85
   6  Install Pump                      6          4        7        .
   7  Deliver Material                  2          1        3        .
   8  Assemble Tank                     4          3        6        .
   9  Erect Tower                       6          6        7        .
  10  Pour Foundation                   4
  11  ____________________________     ___
  12  ____________________________     ___
  13  ____________________________     ___
  14  ____________________________     ___
  15  ____________________________     ___
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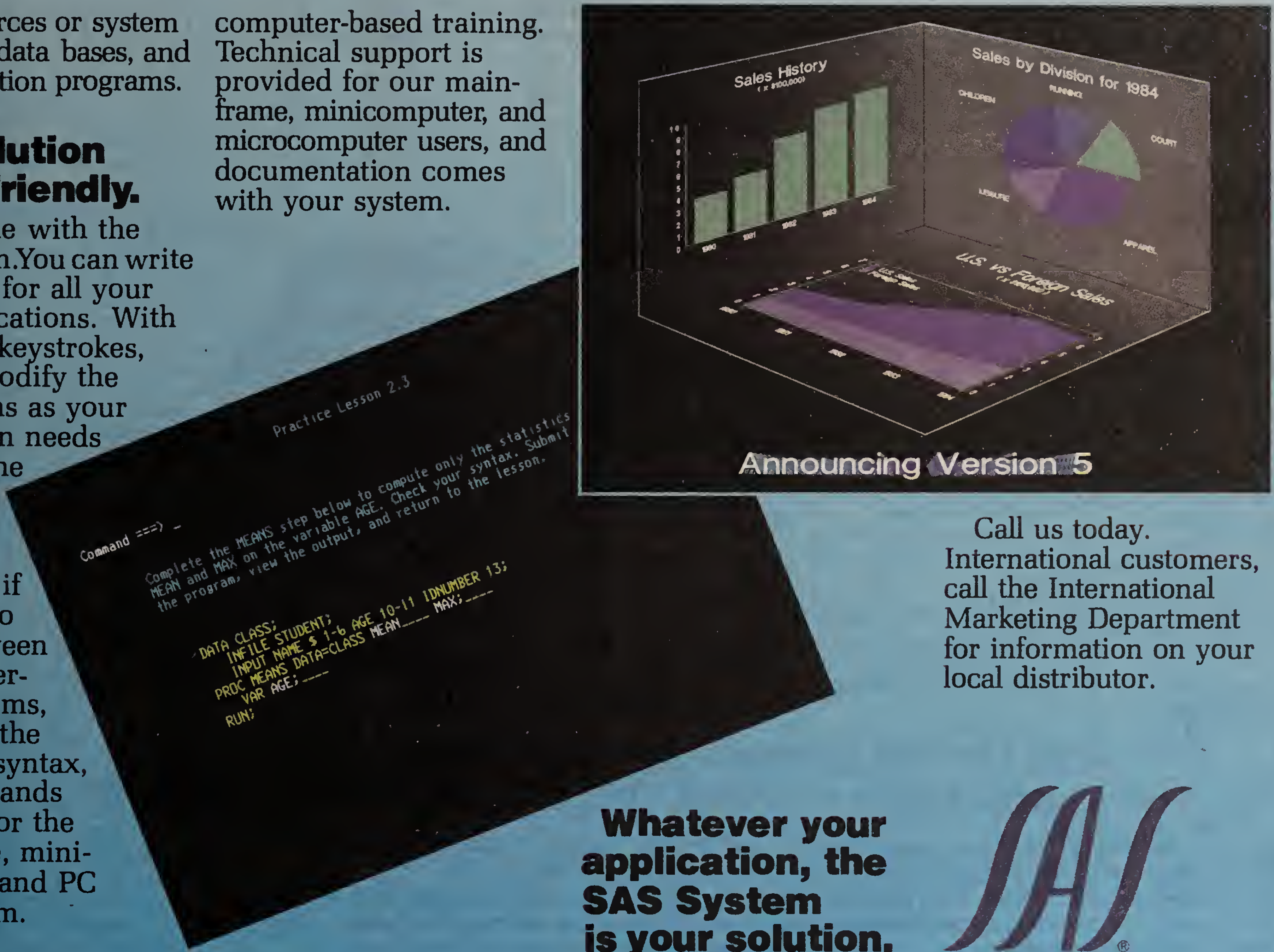

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```
                    Practice Lesson 2.3
Command ===> _

   Complete the MEANS step below to compute only the statistics
   MEAN and MAX on the variable AGE. Check your syntax. Submit
   the program, view the output, and return to the lesson.


    DATA CLASS;
       INFILE STUDENT;
       INPUT NAME $ 1-6 AGE 10-11 IDNUMBER 13;
    PROC MEANS DATA=CLASS MEAN____ MAX;____
       VAR AGE;____
    RUN;
```

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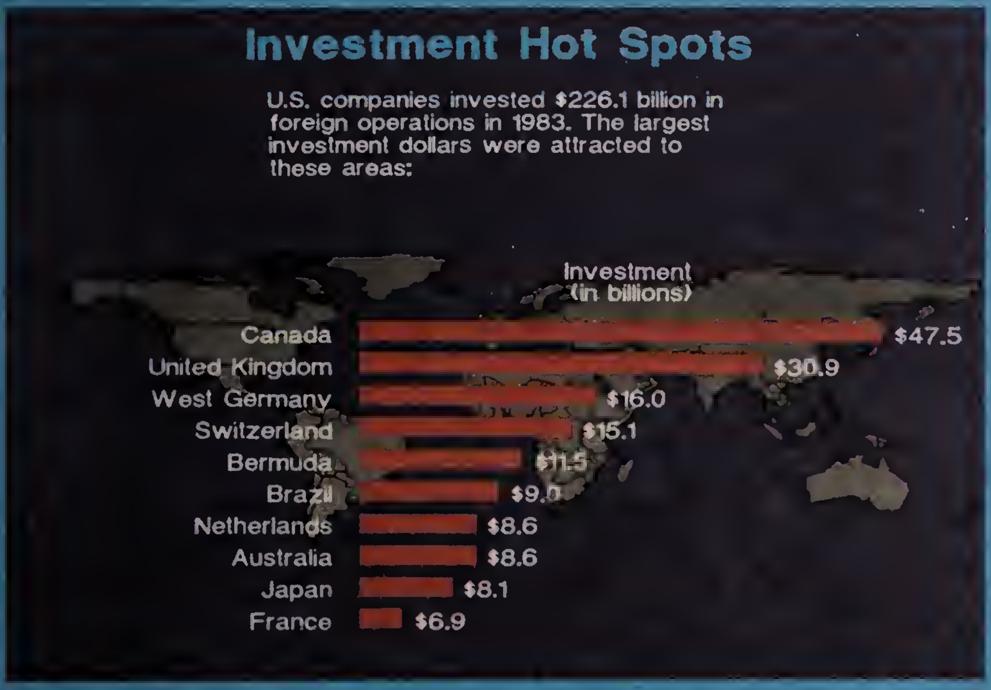

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VIEWPOINT

Debating the role of the systems analyst

From page 16

as the managers and workers they deal with is whimsy. If they ever do, *they* should be the managers. A systems analyst's role in a corporation is to find cost-effective — a phrase sorely missing in the article — solutions to the information needs of the various departments in the company. They can best do this with a thorough knowledge of information processing. Knowledge about the specific business and the specific department within the business is important but secondary.

What would happen if systems analysts with no programming experience tried to run the whole show would be simple: The programmers would end up handling the entire "back end" of the systems analysts' job. The systems analyst would behave like a customer or user because that's what he sees. The programming staff would be made up of nontechnical people, and once that happens, you might as well eliminate the systems analyst and let the programmer talk directly to the users.

If you want to take the author's advice, be prepared to double your DP staff at the expense of your other departments' best people.

Russell Hoffman
Bridgeport, Conn.

Star Wars' technical windfall doubted

Had the article, "The Impact of Star Wars on MIS" [CW, Feb. 10], been written by a less talented individual than Charles P. Lecht, the urge to reply might be diminished. However, Lecht's standing in information processing diverts attention from the major idea propounded. In brief, it is argued that no risk is too great.

Because "the possible offspring of Star Wars research" are holographic systems, the value of which I am in no position to evaluate, the Star Wars program becomes desirable. While I believe it is naive to say that holographic information systems will "reveal truth," the question of Star Wars is, Will we survive to realize any benefits? For any of us who have ever written more than a handful of instructions to be loaded into and executed by a computer, to rely on a large collection of diverse systems for the survival of the human race is surprising.

Even if the technology of Star Wars were to work, that is, all the hardware, software, communications and design logic proved flawless — a condition that eludes us even with many of our household appliances — I fear the mathematics of the problem, that is, they only have to throw one more than we can catch.

Lecht claims not to be happy with the "madness" that motivates the proponents of Star Wars, but he is willing to stand by and accept the speculative fruits of a poisoned and poisoning tree.

Alan Gotthelf
New York

■

This is in response to the Viewpoint article "The Impact of Star Wars on MIS" [CW, Feb. 10].

Once again, we are lead to the conclusion that war and preparation for war somehow benefit mankind. The writer, who obviously thinks of himself as some kind of visionary scientist while cramming his pockets full of hard-earned tax dollars that come from us taxpayers, seems to have missed the point. It is a shame that such great technological advances that will benefit us all in such dramatic ways should only come about as the by-product of some pie-in-the-sky advanced weapons system.

If the original intention of such research were to develop these wondrous by-products, I can only wonder how much sooner we might see them in constructive applications.

Cary S. Peele
DP consultant
Ventura, Calif.

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EXECUCOM

COMMUNICATIONS

DATA STREAM
Elisabeth Horwitt

Woes of the one-stop shop

Many people besides me must be getting tired of hearing vendors boast that they offer a "total networking solution." The unspoken — also unproven — assumption here is that most customers welcome the opportunity to buy all of their communications needs from one source.

The most obvious beneficiary of this arrangement is the vendor, which minimizes the risk of losing business to competitors through gaps in its product line. Customers, especially large companies with varied and growing networking requirements, are likely to lose as much as they gain from a one-on-one relationship.

Admittedly, the business that sticks with one vendor has reasonable assurance that various networking components will work together. If this does not happen, at least the customer knows where to call up and complain. IBM, for example, has so many incompatible and competing communications protocols that it might as well be several vendors. But according to IBM-watcher Atul Kapoor — who is vice-president at Haworth, N.J., consulting firm Kaptronix, Inc. — as long as you're a "true blue," IBM-only shop, Big Blue will take care of linking up your Disoss and DIA/DCA and Netbios and LU6.2 systems "transparently, so that the user need not worry which protocol is being used. The problem arises if you happen to want to link other vendors' systems as well." Then, as far as IBM is concerned, you are on your own, Kapoor says.

See **WOES** page 30

Horwitt is Computerworld's *senior editor, communications.*

Applitek sharpens offerings

Latest gateways, software edge up on competitors

By Elisabeth Horwitt

WAKEFIELD, Mass. — Applitek Corp. has strengthened and broadened its host-to-host network offerings with two significant announcements this month. On March 4, the vendor introduced the NI 10/G, a gateway between Applitek's Unilan and a wide range of computer hosts and communications environments. And last week the company announced an agreement with Flexlink International to market jointly high-level software interfaces that will allow Flexlink's multivendor file transfer software to run on Applitek's DR11-W high-speed parallel interface.

The NI 10/G, a Motorola, Inc. 68000-based gateway priced from $11,000, permits ASCII terminals to communicate with IBM, Sperry Corp., Honeywell, Inc., NCR Corp., Digital Equipment Corp. or Burroughs Corp. mainframes — or with Intel Corp. Multibus systems running Unix, such as NCR Tower or Sun Microsystems, Inc. computers. An X.25 gateway configuration is also available. The NI 10/G supports data rates of up to 19.2K bit/sec. per port. Terminals reside on Applitek's local net, Unilan, which supports baseband, broadband and fiber-optic media.

Applitek and Flexlink have jointly developed and are now marketing communications products that will permit hosts from different vendors to exchange files using Flexlink's communications software over Applitek's DR11-W high-speed bus. Flexlink's family of software products connect IBM systems running VM; DEC VAXes running VMS; Gould, Inc. systems running MPX; and Sun and Apollo computers. Flexlink software prices per host-to-host link range from $30,000 to $70,000.

Applitek's DR11-W interface, available immediately at prices starting at $11,000, provides multiple parallel host-to-host connections. Hosts can be connected directly or over multiple Unilan network channels. Each connection supports up to 10M bit/sec. transmission rates, and multiple connections can be set up on multiple broadband or fiber-optic channels, bringing total throughput up to more than 100M bit/sec., according to Applitek spokesman Gerald McDonald.

Scott Haugdahl, senior systems special-

See **APPLITEK** page 25

Local phone companies eyeing market for voice mail services

By Peggy Watt

DALLAS, Pa. — Voice messaging, which up to now has been available primarily as an expensive adjunct to in-house private branch-exchange systems, may soon be offered by local telephone companies as a subscriber service. At least one telephone company has a limited offering, and others are studying the market.

The former Bell operating companies, under terms of the AT&T divestiture, are still restricted in some of their service offerings and have to wait for the outcome of the Third Computer Inquiry before launching similar programs of their own. But the local telephone companies, while still regulated by their state public utility commissions, are less hampered.

Commonwealth Telephone Co. in late February introduced voice mail services in three of its 78 Pennsylvania exchanges in the Wilkes-Barre area. The company would release no enrollment figures, saying only that customer response has so far met its expectations.

"We're promoting it to customers who would otherwise use an answering machine," says Commonwealth spokeswoman Linda Stallone. She adds that the company is "still testing" the service. "If it proves successful, we are committed to providing additional network services."

Commonwealth Telephone's voice mail

See **PHONE** page 24

INSIDE

Vendor troubles continue to plague the U.S. Postal Service's communications network/**26**

NEW THIS WEEK

- Codex offers the 6240 Digital Transmission Multiplexer
- For more on this and other new products, see pp. 103-129.

INSTANT ANALYSIS

'LU6.2 is a complex architecture with a lot of overhead. It's fine for complex interactions between processes or real-time communications between intelligent systems. But for simple file retrieval or for PC communications, it's overkill, and unfortunately you can't implement a subset of LU6.2.'

— Atul Kapoor, vice-president, Kaptronix, Inc., in Haworth, N.J.

United Telecom, GTE alliance merges subsidiaries' strengths

Seek head-on telecom company competition

By Elisabeth Horwitt

On Jan. 16, United Telecommunications, Inc. and GTE Corp. jointly announced the signing of a letter of intent to form a partnership consisting of their long-distance telephone units, GTE Sprint Communications Corp. and U.S. Telecom, and their data communications subsidiaries, GTE Telenet Communications Corp. and U.S. Telecom Data Communications Co., formerly known as Uninet. J. David Hann is president of GTE Telenet and discusses the merger's current prospects and plans in the telecommunications market.

INTERVIEW

CW: How will the merger be administered?

HANN: By the office of the president, consisting of Charles Skibo, president of U.S. Telecom, Donald Prigmore, president of GTE Sprint, and me. Skibo will be the line officer responsible for voice, I'll take charge of the data business, and Prigmore will oversee staff support, human resources and legal matters. We'll report to the Partnership Committee, which is like a board of directors.

CW: What can the merger accomplish that GTE and U.S. Telecom couldn't do alone?

HANN: The Sprint-Telecom alliance and the Telenet-Uninet alliance are complementary. United Telecom is committed to fiber. It has installed around 5,000 miles, all digital, good for both voice and data. It targets large businesses; GTE Sprint targets small businesses and residential customers and has a wider reach: It covers close to 100% of the U.S.

So the companies have complementary customer bases for a digital network.

CW: How is the new alliance going to fare against AT&T?

HANN: AT&T is strong in voice, less strong in data. Accunet only has around 100 nodes, and it's a basic X.25 network. Value-added services are what will drive the market now, such as one terminal being able to access multiple hosts. Customers need more than high-volume computer-to-computer links. They need PC-to-computer, they need voice/data links, they need multiple connections around the world to different vendors' equipment. We interface with a wide range of terminal and host types. We have direct-connect agreements with 18 to 20 countries on the data side, and later this year we will announce links with foreign electronic mail services, similar to the one Telemail has with Telecom Canada.

CW: The electronic mail market's growth has been disappointing to some people. How is Telenet tackling that area?

See **HANN** page 25

Phone companies eye voice mail

From page 23

services run on Voicememo, a voice store-and-forward system from Centigram Corp. Subscribers are assigned a voice mailbox code, which they can call to retrieve messages left for them during the day. Because the equipment is Commonwealth's, customers are spared installing additional telephone wiring or equipment and can gain access to their mailboxes through any standard push-button phone. Charges range from $5 to $16 per month per mailbox, depending on the type of plan and number of messages.

Long-distance telephone company Alltel Corp. also is considering providing voice mail services to its subscribers. The parent company already has a successful Centigram installation at one regional office of its Little Rock, Ark., subsidiary, Alltel Supply, Inc. Service and installation field representatives use the Centigram voice messaging system to report in and receive messages. James Wagner, Alltel plant operations manager, estimates that the system has already boosted productivity by 12% to 25%.

Central Telephone Co. in Las Vegas, one of the largest independent telephone companies, is researching customer demand for voice mail "as another value-added service," says Gary Klann, marketing and operational planning administrator. The company expects to make a preliminary decision later this year.

Klann says that the proposed service would target businesses that could use voice mail but are put off by the costs of buying and installing an in-house system. A typical configuration includes a computer and hard disk, software and often a private branch exchange. The system converts voice signals transmitted over telephone lines into digital form for storage on disk and later retrieval by a user with the correct password.

A four-port Voicememo system from Centigram, capable of storing five hours of messages, starts at $29,995; a 14-port Voicememo system, with capacity for 30 hours, starts at $79,995. Another established voicemail offering, Rolm Corp.'s Phonemail, costs $45,000 for four channels and $98,000 for 16 channels.

The high entry-level price of an in-house voice mail system, coupled with the still innovative nature of voice store-and-forward technology, has kept even large companies wary, according to one consultant who is trying to promote such products.

"I can't get a client to raise an eyebrow," says Dick Hannon, consultant with Hancock and Hannon, a telecommunications consulting firm in St. Louis. He recently pitched the voice mail concept to a law firm as an ideal method for solving telephone tag problems, but the partners turned their thumbs down.

But new offerings from local telephone companies, and the former Bell operating companies in particular, could launch a different kind of voice messaging market, another analyst says.

"Once opened, voice messaging could become a significant service bureau market," says Victor S. Wheatman, senior consultant for Input, Inc. in Mountain View, Calif.

The local telephone companies' voice messaging services may also boost sluggish voice mail system sales by allowing potential customers to explore the application's potential paybacks and problems without committing themselves to an in-house system. Prior to the telephone companies' entrance into the market, the only way companies could try out voice mail before buying was by renting voice mail boxes from vendors like Voicecom Systems, Inc. of San Francisco and GTE Corp.'s Telemessenger subscription service.

Voicecom's mailbox rental rates range from $40 monthly for an individual to $20 monthly for each of 400 users in a company account with no extra charge per message. In addition to renting voice mailboxes, the company sets up and manages shared and dedicated voice mail systems.

'Now asking for help'

Voicecom President Ralph Kincaid sees the voice messaging market growing, if not as rapidly as early analyses suggest. "We have companies coming to us now that a few years ago were buying more expensive internal systems and are now asking for help," he says. The 2-year-old vendor currently has offices in San Francisco, Los Angeles and Seattle, and it plans to open seven more sites in the next 14 months. Kincaid does not expect much competition from the local telephone companies.

GTE's Telemessenger is a voice messaging subscription service available since 1983. The service currently has 11 domestic branches and recently opened its first international office in Japan. Four additional foreign offices are scheduled to open next month, according to Arvind Jadhav, vice-president and general manager of Telemessenger.

Nonregulated subsidiaries of several local telephone companies, both GTE companies and former Bell operating companies, have contracts to resell Telemessenger, but Jadhav says he does not expect competition from regulated local telephone companies for at least another three years.

A spokesman for General Telephone Co. of California in Santa Monica, Calif., one of GTE's largest local telephone companies, confirms that it is negotiating with several manufacturers of voice store-and-forward equipment as preparation for offering such service to local telephone customers within the year.

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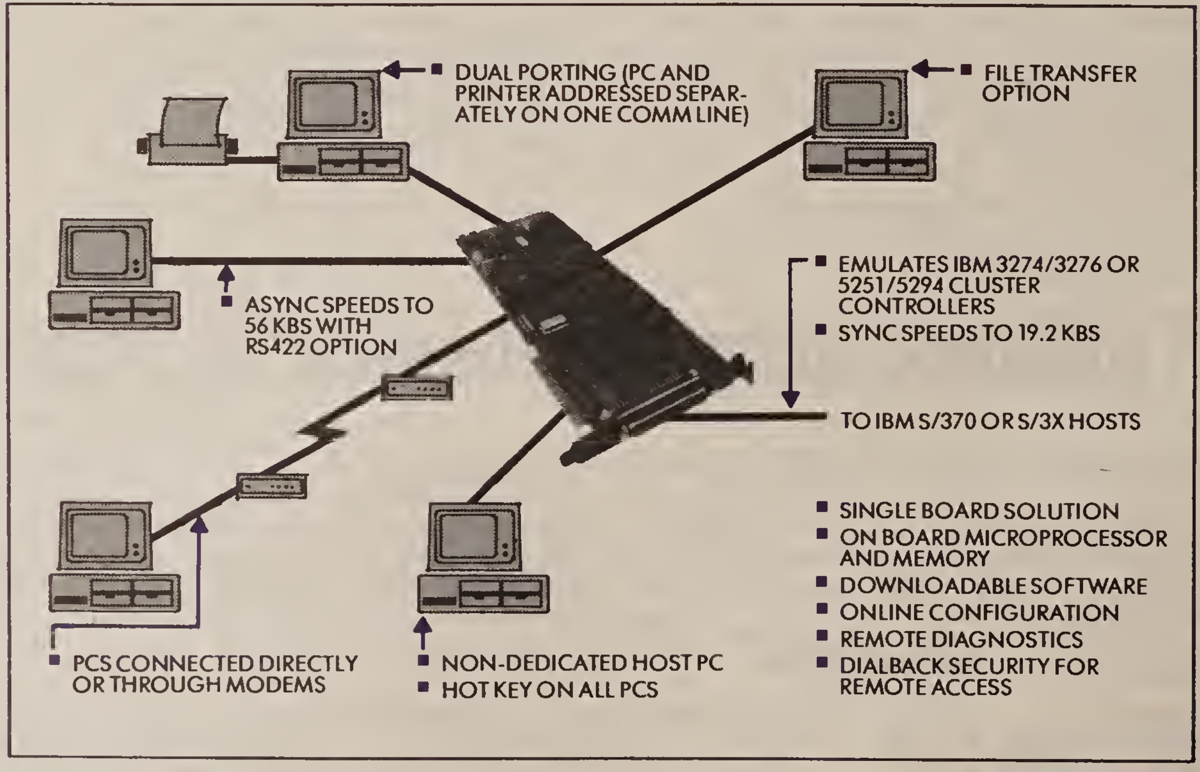
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Hann: Merger will be complementary

From page 23

HANN: Electronic mail has been slow to be accepted because of the failure of companies like ours to show senior management how the service can improve productivity. It's like what has happened with PCs in a way — a lot are just sitting because people have to learn how to use them.

We see a lot of potential in the foreign market, among countries that are slowly moving away from telex, toward electronic mail. Our strategy there has two phases. One is to set up our own electronic mail system in a country. In deregulated countries like the UK and Japan we can dò that, competing with domestic services. We'd prefer that, but we can't convince everyone. In countries regulated by the public telephone and telegraph authorities, we have to link up our electronic mail service with the country's service.

CW: What other markets is GTE Telenet targeting at the moment?
HANN: We are doing credit authorization, clearing and closure for retail outlets. We provide networking, terminals, computer storage space and hookups with major credit card companies. We also compile the day's accounts for retailers. The big organizations like J. C. Penney do it on their own networks; we target vertical markets like lumber company franchises, regional department stores and gas stations. One hundred billion transactions take place a year, and it has been estimated that as high as 40% are electronic. So there's a big market ahead.

CW: Some analysts predict that the big corporations will choose more and more to manage their own private networks. How do you see that trend affecting the GTE-Telecom alliance?
HANN: At first companies will try to do it all in-house. Then they'll find they need a large staff to maintain lines, manage the network, which forces them to defocus from their main business.

Look at General Motors Corp., buying Electronic Data Systems Corp. [EDS] to manage its communications. EDS becomes a separate company, divorced from GM's main business.

CW: Can you comment on GTE's recent attempts to prevent the Federal Communications Commission from giving permission to the regional holding companies to offer packet-switched services?
HANN: The media has misinterpreted that. We don't mind their coming in — it's how that matters. Let them compete with us head on. What Telenet objects to is the former Bell operating companies' filing tariffs that don't reflect hidden costs of establishing a new service, like marketing support, product development, filing for approval. We spend 10% to 11% of our revenue in developing services. I'd say their predictions of costs are naive; even the FCC doesn't believe them. So they'll be stuck with tariffs that don't cover costs; they'll find that the intralocal access and transport area data market isn't as strong as they expected, so they'll maintain artificially low prices that will have to be subsidized by profits from their telephone operations. Their packet switching services will be a very small part of their total operations, anyway.

CW: What percentage of GTE Communication Services is Sprint voice communications, and how much is Telenet packet-switched services?
HANN: GTE Communications Services' revenue was about $1.2 billion in 1985. Sprint had the lion's share of that; we don't break out Telemail, Telenet and so on.

CW: How do you foresee the competition with the former Bell operating companies in the future?
HANN: We'll supply, use and compete with the companies at the same time. If we can sell our electronic mail system to a competitor, we will, or if they offer a service that's better than ours, we'll resell it.

Applitek sharpens its offerings

From page 23

ist at Minneapolis consulting company Architecture Technology Corp., said that Applitek's new gateways, coupled with the Flexlink marketing agreement, make the vendor a strong player in the computer room networking arena, which up to now has been dominated by Network Systems Corp.'s Hyperchannel A. "Applitek's Unilan is geared to the traditional minicomputer environment. They can get into more markets than Network Systems on cost comparison alone, since Hyperchannel A costs more than $50,000 per connection," Haugdahl said.

Hyperchannel A's 50M bit/sec. data rate far outpaces the 10M bit/sec. Unilan, however, making it far more suitable for powerful mainframe-to-mainframe communications, Haugdahl said. But he added that the Flexlink announcement makes Unilan quite competitive with the Hyperchannel B, Network Systems' recently announced 10M bit/sec. network for minicomputers and supermicrocomputers.

Network Systems' Netex communications software offers file transfer capabilities similar to those of Flexlink among a wider range of vendor systems. The vendor also offers high-speed parallel channels.

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Postal Service runs gamut of communications setbacks

Finds snags en route to nationwide network

By Donna Raimondi

SAN MATEO, Calif. — During its move toward national on-line applications, the U.S. Postal Service has run the gamut of communications problems. Brian Hammond, director of the San Mateo Data Center, says the service has had to deal with unreliable communications front ends, a sporadically unavailable data transmission service vendor, departing communications technical staff members and delays in leased-line deliveries from AT&T. The agency is in the process of solving some of these problems; others appear to have no immediate solution.

Postal Service Data Centers all use IBM or IBM-compatible mainframes. The major data centers trade files, operating on what they call a time concept. One center writes the software for any given system that is shared among the other centers. Changes in programs are transmitted to all centers.

Most post offices have IBM 3270 terminals or, as in the case of a test location in Stockton, Calif., 3270 emulation on personal computers. The post offices send their data to the major centers primarily over AT&T leased lines.

Incoming data from regional operations is consolidated on the data center mainframes. For example, general ledger files from each region are consolidated into national reports.

Around-the-clock service

Data centers have difficulty keeping mainframe hosts available around the clock. The almost 24-hour window is needed to serve users across the country that go on-line in different time periods. "We learned that it is really great to have a remote IBM CICS system out there, but what that requires is about 98% uptime during a service window," Hammond says.

The data center administrators are currently considering whether it is necessary to be on-line all the time. In a meeting a few weeks ago, directors of the several main data centers talked about relieving some of the system load by putting smart terminals or personal computers in the post offices. Users would perform most of their work locally and transmit the results to the data centers from their PCs at night, cutting the service windows to a few hours a day.

Other recent sources of trouble are the NCR Comten, Inc. front-end telecommunications systems. The front end — the arm that accepts transmissions and channels them into the main CPU — does not offer the reliability that the Postal Service needs, Hammond says. In a business that must have 98% to 99% reliability, networking problems have degraded the system into the 70% range over a two-week period.

Hammond is not sure if the network problems are caused by the vendor or by data center operations, but he is not always happy with vendor support. "Maybe what we are experiencing is growing pains," he adds. "As we grow, the reliability is becoming more and more of an issue.

"Any vendor can have problems," he says. "My big concern is how the vendor deals with it. Ninety-five percent of the time, a vendor should be able to circumvent the problem within an hour, get my users a backup system and fix the problem within 24 hours. Otherwise he and I are not going to be friends. I'm going to have to come up with standards and rate vendors on those standards."

Value-added net services

Hammond is also paying close attention to the two packet-switched, value-added network services — McDonnell Douglas Network Systems Co.'s Tymnet and U.S. Telecom's packet-switched service Uninet (soon to merge with GTE Telenet Communications Corp.). The Postal Service uses the value-added network's facilities when data traffic between two sites is too sporadic to justify a leased-line connection. The Uninet system has been installed for about a year and was on probation for a while, Hammond explains. Since Hammond established standards for the vendor to live up to, the situation has improved, he says.

Tymnet is reliable but very expensive, Hammond says, although that service "decided to get more competitive pricewise" since the Postal Service added Uninet.

The biggest problem with AT&T has been the availability of leased lines. Once the lines are in, Hammond says, they are very reliable. "The problem has been getting AT&T to meet my needs and meet them now," he says. Hammond will not promise his users any system that relies on leased lines until he gets a commitment from a very high level in AT&T.

Alternatives to vendors

The data center directors have discussed a number of alternatives that would free the Postal Service from relying on unsatisfactory vendor relationships. "We have thought about using satellite links; we have considered putting in our own private networking systems; we have thought of a whole lot of things," Hammond says. "But it is all pie-in-the-sky. We have to do what we are doing now well before we start doing anything else," he adds.

One possible reason why installing private networking facilities has not seemed a viable option for the Postal Service is a scarcity of experienced network technicians. The data center at San Mateo monitors networking problems, and the Raleigh, N.C., center is responsible for fixing them. Raleigh has trouble keeping good network staff members, however, so the Postal Service may decide to fix all network problems regionally.

One of the problems with recruiting network experts is that the Postal Service cannot pay six-figure salaries, Hammond says. One alternative is to bring in a contractor to manage the network; another is to become a contractor and sell services to the Postal Service.

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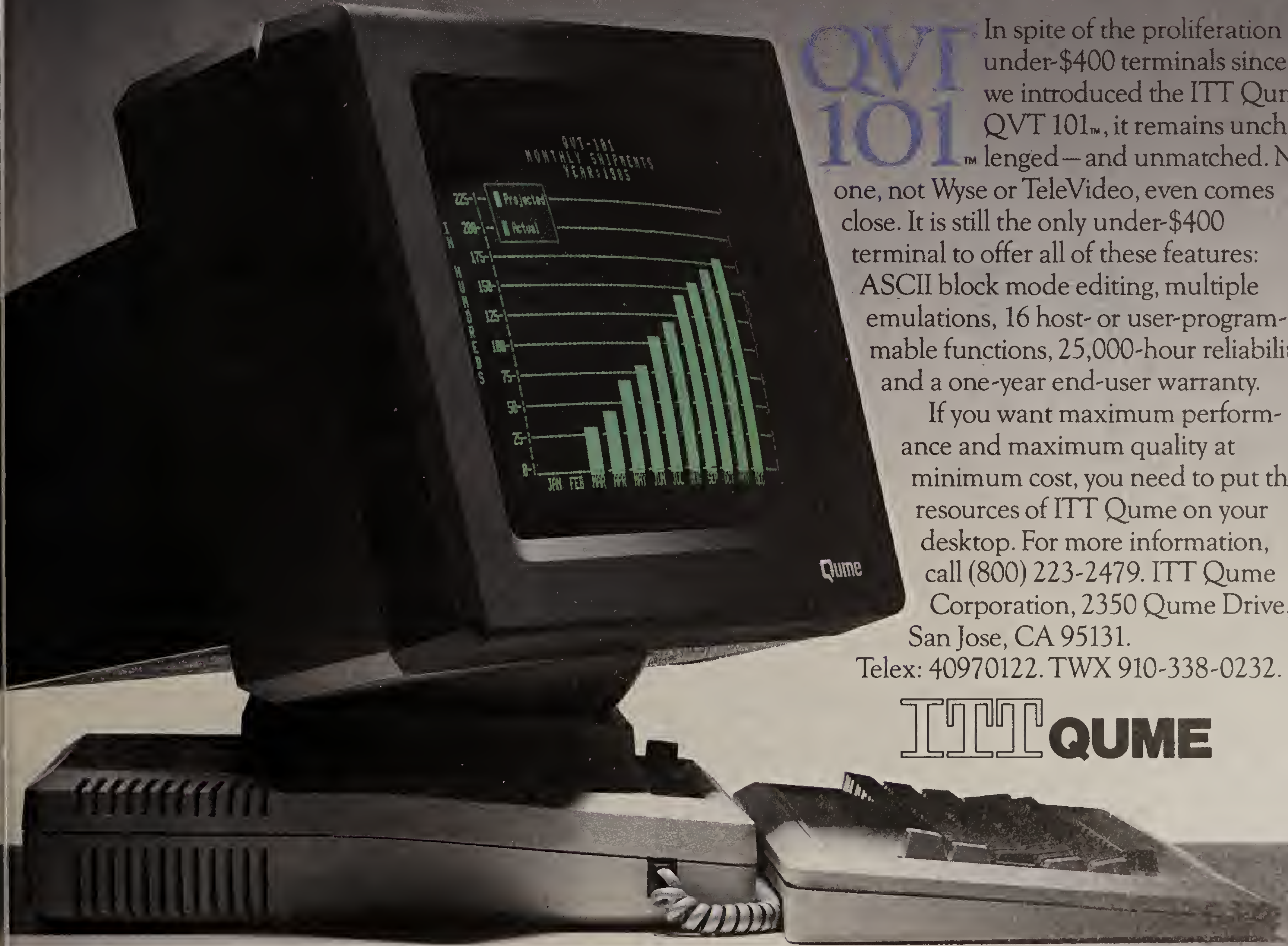

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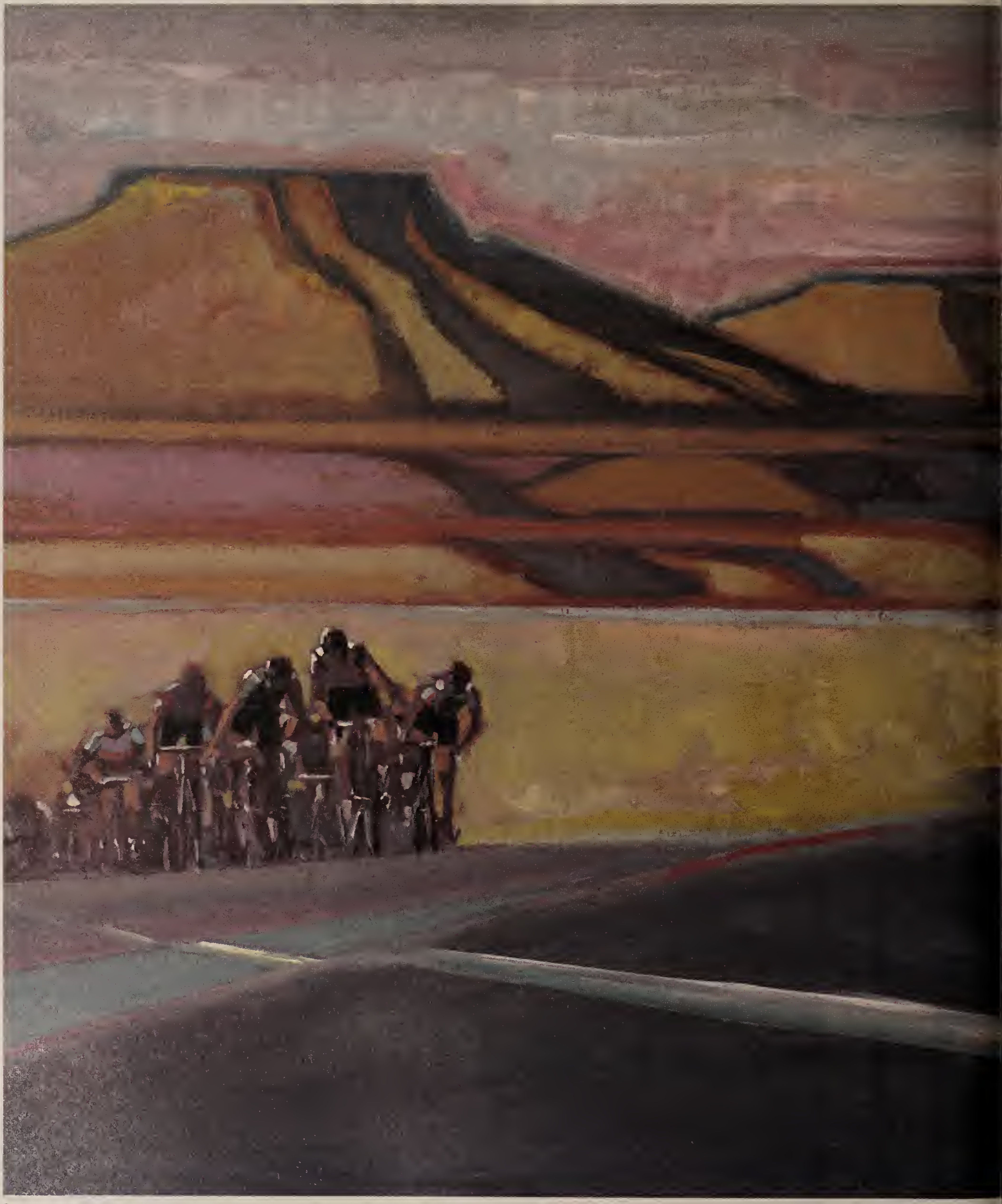

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Woes of the one-stop shop

From page 23

IBM's isolationist policy may have discouraged a few customers from going out and buying systems from other vendors. But in the long run, IBM is finding that it cannot successfully ignore the rest of the world. Fortune 500 corporations with big DP budgets simply have computing needs that are too extensive and varied for one vendor to fill — even if that vendor is IBM.

As a result, companies like General Motors Corp., which need to have their disparate systems connected in one communications environment, are pressuring IBM to support a communications standard not its own — the International Standards Organization's Open Systems Interconnect (OSI) model. "A consensus of users and vendors around an OSI standard should scare IBM," Kapoor comments. And IBM, by joining the Corporation for Open Systems, seems to be caving in to that pressure.

If IBM cannot command exclusive loyalty from its customers, it is hard to imagine that smaller vendors can do so. And yet a growing number of communications vendors consider providing a total network solution as a crucial element of their competitive strategies. The strategy can backfire, however, when the vendor overextends its product line beyond the product areas where it has established technical and marketing expertise.

Here is a classic case in point: Northern Telecom, Inc. is a major force in the central office switch and private branch exchange arenas. Approximately a year ago, the vendor introduced Meridian, a combination voice/data communications system, local-area network and office automation host running Microsoft Corp.'s MS-DOS, CP/M and Unix-based user applications.

Industry observers questioned whether Northern Telecom could make it in the OA arena, which is already dominated by the likes of Digital Equipment Corp., Wang Laboratories, Inc. and IBM. Recently, a Northern Telecom spokesman went almost as far as admitting that, so far, the product has failed to catch on.

The right combination

Of course, the right combination of products can make up a highly successful total solution. Digital Communications Associates, Inc. (DCA), for example, has profitably expanded from modems and multiplexers to micro-to-mainframe links with shrewd acquisitions of first a product line, the Irma series, and lately a company, Forte Data Systems, Inc.

Through its acquisitions, DCA is becoming a "one-stop communications vendor" without having to develop all of its products from scratch, according to general manager Jose Porto. He concedes, however, that DCA cannot offer the best possible networking solution to all users in all areas. And he acknowledges that one of the most serious gaps in communications vendors' product lines are the bridges, gateways and network management tools that permit users to integrate different vendors' products into a seamless communications system.

The gateway gap is being filled fairly well by third parties. Recent announcements of gateway products from Excelan, Inc., Network Systems Corp., Applitek Corp. and Bridge Communications, Inc. show these vendors' ongoing commitment to linking incompatible networking environments.

Multivendor nets

What third-party vendors cannot do, however, is provide effective means for users to manage and monitor a multivendor network. To provide a truly integrated multivendor network management system with high-level features like color graphics and menus, vendors must agree to work together.

Unfortunately, as Porto admits, companies like DCA "will continue to hedge" when users ask them to develop multivendor network monitoring and management tools. "Why should a networking company cooperate with its competitors?"

Why, indeed? Unless, as is likely in the next few years, the number of corporations using multivendor networks reaches critical mass, and vendors follow IBM's example by bowing to customer pressure.

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Forget about user-friendly

A computer for "the rest of us." While that turn of phrase was perhaps the most clever to date, Apple Computer, Inc. was not alone. For quite some time, the other personal computer makers and software developers have been trying to hustle people into buying systems packed with "user-friendly," "intuitive" and "ease-of-use" features — even with "artificial intelligence."

Of course, if you are a member of the personal computer industry, you know that such claims are bunk. The industry has the well-entrenched attitude that it makes computer systems for the rest of them — the great unwashed — those who cannot count to nine in hexadecimal.

One morning recently I was rudely reacquainted with the industry's treatment of ordinary people. It started out simply enough: I was trying to wrap up an article about the new wave of desktop/window packages.

I had written about Digital Research, Inc.'s Graphics Environment Manager (GEM) Desktop product, among others. When you first install GEM, you go through a tedious but perhaps unavoidable process of telling it about your hardware, in particular your mouse. I told GEM that I had a Microsoft Corp. Mouse, and the product made me scrounge through my shoeboxes of old disks to find the original floppy disk of mouse driver programs so that I could reload the driver onto my hard disk.

See **FORGET** page 36

Licklider, a computer systems consultant, has written extensively about personal computers.

Vendors bet on hard cards, but corporate role debated

By Peggy Watt

An internal storage technology that that breathes new life into older personal computers is gathering interest in the marketplace but probably, in the long run, will reach a limited number of corporate buyers.

Hard disk drives have shrunk to 3½-in. models spinning on their side, mounted on expansion cards inside micros. Since Plus Development Corp. of Milpitas, Calif., announced its Hardcard last spring, it has been joined by at least eight competitors.

The hard disk on a card is often more portable than an external or internal add-on hard disk drive and does not take the desktop space of its larger predecessors. However, it may be more expensive, and it does take one or 1½ card cage slots.

"It's a beginning phenomenon," said Bob Katzive, vice-president of storage industry journal "Disk/Trend Report," published in Mountain View, Calif. He estimated 1985 shipments at fewer than 100,000 but added that the numbers are building steadily — though they could slack off as fewer machines ship without hard disks.

The earliest hard-disk-on-a-card products were released last fall. They are just now completing the evaluations that are part of most MIS procurement procedures, and a number of corporations have concluded that there is relatively little need for the devices. But the cards also have won some enthusiastic converts and spurred increasing competition.

Plus is quick to claim its place as pioneer, having first delivered its 10M-byte Hardcard last September after two years of development. The supplier recently dropped the price from $1,095 to $895, after Mountain Computer, Inc. of Scotts Valley, Calif., released a 20M-byte model that costs $1,195. Mountain Computer's 10M-byte version also appeared last fall and costs $995. A $1,449, 30M-byte version is promised by April.

See **VENDORS** page 37

Dectalk speaks to bank's needs

DEC voice synthesis device retrieves, reports balances

By Douglas Barney

On weekday mornings, radio station WBCN in Boston broadcasts music, news, commentary and the ramblings of Carlos, a regular on the morning shift. Sounding much like a Swede with a speech impediment, Carlos has successfully concealed his true identity from less attentive listeners who are actually waking up to the sound of Dectalk, a voice synthesis device from Digital Equipment Corp.

While WBCN, which uses Dectalk to entertain and annoy its listeners, is the equipment's most conspicuous customer, large organizations are putting the technology to more serious work. Among these, Chemical Bank of New York uses Dectalk to dispense balance information to corporate customers, work formerly done by clerical help.

Called Audio Balance Reporting, the system uses the bank's existing phone system hooked into the Dectalk system. "Dectalk retrieves the information from the DEC Microvax II where the balances are resident," said Earl Jennings, assistant vice-president in the wholesale deposit area for Chemical Bank.

Most of the 92 current users of Audio Balance reporting are large corporations that need regular balance information and are lured in part by the cost savings of the Dectalk system. While it costs $200 per month to query regularly Chemical Bank operators for balance information, it is only $55 per month to query Dectalk for

See **DECTALK** page 38

INSIDE

Microsoft simplifies development licenses/**32**

The PC Software Interest Group puts its entire catalog of programs on one compact disk read-only memory disk/**38**

NEW THIS WEEK

- Votan combines telephone and voice recognition systems
- For more on this and other new products, see pp. 103-129.

INSTANT ANALYSIS

"I'm always told that I'm supposed to worry about pricing deterioration, so I always do. But the average selling price of 1-2-3 is higher now than it's been in two years."

— Jim Manzi, president, Lotus Development Corp.

Oracle unveils productivity tools for SQL/RT on the IBM RT PC

Oracle Corporation has announced six software products for the newly-announced IBM RT PC system. The packages run with IBM's SQL/RT relational DBMS, which was developed by Oracle for IBM. Oracle also announced immediate availability of its full ORACLE product line on the RT PC/AT co-processor.

According to Oracle Director of Product Marketing, Ken Cohen, "The SQL/RT product which IBM is marketing on the RT PC provides a robust relational DBMS. Since Oracle was the source of SQL/RT, we feel well-suited to offer our other products directly. They provide even greater flexibility and decision-support capabilities to RT PC users."

☐**Pro*Fortran**: The Pro*Fortran precompiler allows RT PC programmers to embed SQL database language statements in the middle of their Fortran programs. It is intended for Fortran programs which must access or manipulate SQL/RT database information.

☐**Pro*SQL**: Pro*SQL is a general-purpose call-interface to SQL/RT. Using a simple set of programming calls from a variety of languages supported on the RT PC, the programmer can access SQL/RT.

☐**SQL*IAF**: The SQL*IAF (Interactive Application Facility) package is a complete application generator and run-time system for forms-based applications. It is a complement and extension to the Easy SQL/RT component of IBM's SQL/RT.

The SQL*IAF screen painter lets users design forms using *what-you-see-is-what-you-get* techniques. Multi-table query/update forms can be easily produced for demanding applications. Also, SQL*IAF lets users apply data editing and validation criteria to data entered into forms. Finally, SQL*IAF provides extensive support for non-IBM terminal types, such as DEC's VT-220.

☐**SQL*RPT**: SQL*RPT is a report writer and formatter for use with SQL/RT. Using simple commands, users can create reports of almost unlimited sophistication from their databases.

The database information can also be included in documents formatted with SQL*RPT, allowing text and database processing to be combined in one easy-to-use interface suitable for developers and end-users alike.

☐**SQL*Calc**: SQL*Calc is a Lotus 1-2-3 compatible spreadsheet integrated with the SQL/RT DBMS. Users can place SQL statements into the cells of their spreadsheets, retrieving and updating SQL/RT data automatically. Large SQL/RT databases can be shared among spreadsheet users, with all of the database instantly available to them.

☐**SQL*Link**: SQL*Link provides a micro-mainframe link which allows intelligent transfer of database information between SQL/RT on the RT PC and the ORACLE relational DBMS running on IBM PCs and a variety of mainframes and minis.

SQL*Link lets users exchange information between PCs with ORACLE and the RT PC, with the RT PC serving as a Host.

The package also lets users of SQL/RT exchange database information with a mini or mainframe running ORACLE.

☐**PC/DOS Support**: The ORACLE relational DBMS, 4GL and DSS tools are also available to run on the IBM RT PC/AT co-processor option.

Oracle produces and markets the ORACLE relational DBMS, 4GL and DSS software. ORACLE runs on a wide range of computers, including IBM mainframes, DEC, DG, HP, Stratus and most other minicomputers, and a wide variety of micros, including the IBM PC family.

Oracle distributes its products through a worldwide network of 30 direct sales offices, through the Authorized Oracle Dealer network, and through VARs which participate in the Oracle Alliance program. With its direct and OEM marketing efforts, ORACLE is used by 39 of the top 50 multi-national corporations and at thousands of sites overall.

For further information, contact Oracle Corp., Dept. CWST3, 20 Davis Drive, Belmont, CA 94002, 1-800-345-DBMS.

Microsoft simplifies software development licensing policy

Eases restrictions on in-house use

By Peggy Watt

REDMOND, Wash. — Both in-house and commercial software developers who program with most of Microsoft Corp.'s language products are now spared some paperwork under a revised, more lenient licensing policy.

The agreement, which also applies retroactively to current registered users of Microsoft compilers, allows developers to distribute application programs written in Microsoft languages without signing an additional runtime license agreement, as long as the program does not include code taken directly from the language as part of development.

Usually, only programs written in Basic and Cobol include code reproduced from the compiler, said Rob Dickerson, languages group product manager. Developers whose applications include such code are asked to agree to distribute the code only within their own application product, to not imply in promotions that Microsoft helped write the application program but to include the Microsoft copyright in the program's sign-on message. These were the rules that previously applied to any development using Microsoft compiler products.

Dickerson said the new arrangement should particularly help MIS departments that develop applications for internal use only. The setup also will ease distribution of public domain or "shareware" programs.

He also suspects many Microsoft compiler users were unaware they were even in violation of previous policy by not signing the runtime development license. Current registered owners will be notified of the new policy, Dickerson said.

Softlogic introduces memory tool

By Douglas Barney

MANCHESTER, N.H. — Softlogic Solutions, Inc. last month introduced a $49.95 virtual memory manager, Software Carousel, which allows up to 10 640K-byte applications to be loaded concurrently.

Unlike operating environments like Microsoft Corp.'s Windows, IBM's Topview and Quarterdeck Office Systems Co. Desqview, Software Carousel does not offer windowing or multitasking. Instead, the product offers the ability to maximize available memory and switch quickly between applications.

"The user is able to switch quickly among the 10 tasks, or programs, by simply depressing a 'hot' key [typically ALT] and the assigned corresponding function key," said Edward Tolsen, president of Softlogic.

Software Carousel is aimed at users of micros with devices that expand the machine's random-access memory (RAM) beyond 640K bytes, such as the Lotus/Intel/Microsoft Expanded Memory Specification or AST Research, Inc. Rampage expanded memory board.

In addition to using extended memory, expanded memory and RAM disks, the product can allow floppy and hard-disk storage to act as RAM. The product automatically stores the most frequently accessed programs in RAM and uses disk storage acting as RAM for less used programs. Tolsen said one advantage that Software Carousel has over some operating environments is that RAM-resident programs can be stored separately from the application but can still be called up quickly.

Software Carousel takes up 32K bytes of RAM and runs on IBM and compatible PCs with a minimum of 256K bytes of RAM.

When performance problems are in the wind, outdated monitoring techniques can leave you in the dark. The **EXPLORE*** family of performance monitors from Goal Systems can shed more light on performance problems than older, more limited products.

EXPLORE/VM and **EXPLORE/CICS** offer real time reporting to help you respond to immediate problems. They also provide historical documentation to aid in monitoring system trends. If you are currently limited only to real time reports, the trends in your system cannot be analyzed. Using only historical reporting, immediate problems cannot be addressed. With **EXPLORE/VM** and **EXPLORE/CICS**, you're covered at both ends.

Additionally, **EXPLORE/VM's** extended color support immediately provides information on the seriousness of performance problems without the need for time-consuming analysis of numerical data. Critical problems are displayed in **RED**, to make you instantly aware of when your system is burning up valuable resources.

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Forget about user-friendly

From page 31

(GEM required its own, private copy.)

After installation was complete, I discovered that GEM had ignored me and installed its default mouse. I was mousing around with the wrong kind of mouse.

Of course, like most of the "rest of us," I assumed that I had messed up in the installation dialogue. But then GEM did it again.

However, that contrariness was not the real aggravation. I decided to go through with the full installation process anyway. After I swapped the four diskettes in and out, GEM told me that installation was complete. I then started GEM in the prescribed way, and my computer hung with a half-depicted desktop glowing in green on the screen.

Eventually, I discovered that the GEM installation process had not dealt with the fact that my hard disk had become full during the installation; it blithely copied files to a full disk and then told me all was well.

Printing the hard way

I moved on to print out my article. I mainly use Microsoft Word 2 on an IBM Personal Computer for my writing. I chose Word because it is virtually the only IBM PC word processor that can print to an Apple Laserwriter. I had used this setup for months; it was routine.

So I was pretty surprised when nothing happened when I went to print. It turned out that something had deleted my printer setup files. The culprit must have been either GEM Desktop, Quarterdeck Office Systems Co. Desqview, IBM Topview or Microsoft Windows. I had experimented with all of them in preparing for my article. I still do not know which did the deed.

In any event, I restored the printer settings and tried to print again. I guess that I had been left addle-brained by the morning's tribulations, and I opted for a nondraft printing. Nothing happened. Word did not say it did not support non-draft printing to the Laserwriter. It just formatted the text for printing and then printed nothing.

Now, the PC-Laserwriter link is a fussy one. Sometimes the two get out of synch. Of course, neither tells you about it; printing just stops. The usual cure involves turning the Laserwriter off and on and then resending a preamble file from the PC to the printer again. I did that and tried printing again. No dice. At that point, I became unaddled — or more addled — enough to give draft printing a try. That worked!

Article in hand, I tried to dash off a quick piece on test-driving Chevrolet's (yes, the car maker) $3 Chevy Tech software. It lets you configure and price a Chevy car or truck, look at financing options or play a rather clunky game.

Unfortunately, the game crashed my computer.

While my IBM was rebooting, I slid over to my Apple Macintosh. I had borrowed a never-before-opened copy of Microsoft's Excel program for the Mac from a friend. I was a little nervous that I might erase or damage the distribution diskettes. I couldn't make a backup copy since the diskettes are copy protected, but I could install the product on my Tecmar, Inc. hard disk. Then I could play with Excel with less fear and later uninstall it back onto the distribution floppy.

So I did, only to discover Microsoft's forced software adoption policy. It turns out that you install Excel onto a hard disk once and forever.

The manual and install program said you can install only once, but they never said that you cannot uninstall. I naively assumed you could uninstall.

I wasn't happy, and my friend was even less happy. We haven't quite figured out how to resolve my partial, albeit unwanted, ownership of his program.

At this point, I decided to cut my losses. I shut down the computers and fetched the mail.

In the lot was a packet from Western Union Co.'s Easylink service heralding its new Infact offering. Here was a marketing piece chock full of all the right words: "easy," "simple," "immediate," "experience the ease and power."

Just to assuage doubts, most of the pages in the brochure are headed "It's This Easy." For example, the page about getting financial statements said you can narrow your search by selecting companies based on number of employees. All you have to do is enter the range of number of employees. You do this by merely entering two nine-digit numbers separated by a colon. No, you cannot omit leading zeroes, and, no, you cannot include commas to help you keep your place. For firms with from seven to 70 employees, it's this easy: 000000007:000000070! Now that's downright user-friendly.

Additionally, Infact offers the ultimate in computer user-friendliness with its SOS command — this beckons a real human being (an Easylink staff member) to come on your line and help you out. (Maybe kids in this generation will grow up thinking that SOS means "Save On-Line Systems.")

At that, I realized that I'd eaten my lunch and not noticed it. The morning was over. I stared out the window and wondered how ordinary people coped with this sort of computing.

I imagined them outside the palace of personal computing clamoring for useful and usable systems. I imagined the industry inside. Like Marie Antoinette, the industry says, "Let them eat cake."

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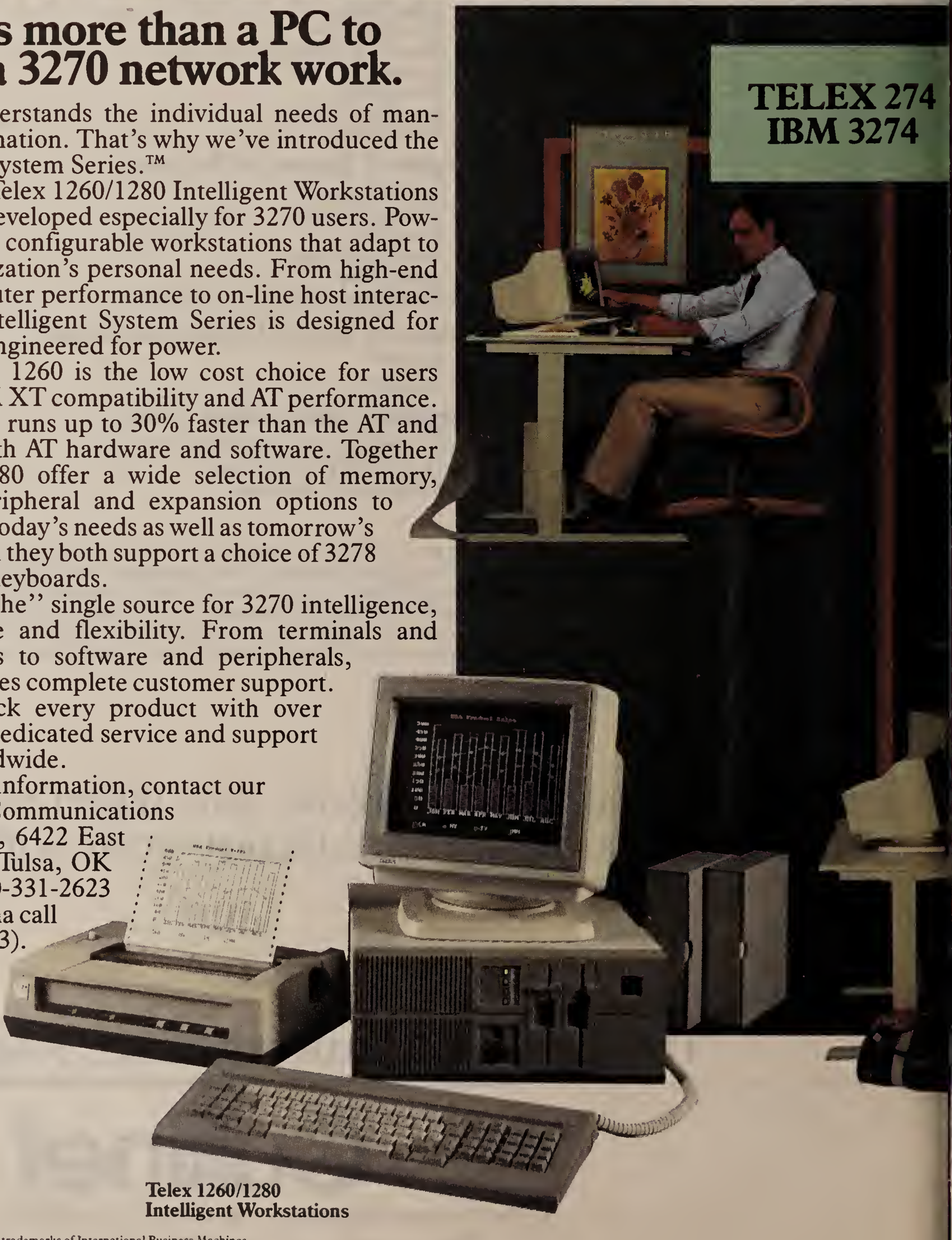

Telex 1260/1280 Intelligent Workstations

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Vendors bet on hard-disk cards

From page 31

"We wanted to create a new category of hard disks," said Hank Chesbrough, Hardcard product manager. "With us and the new competition, I think we have."

Plus also took aim at its prime competitor in court, filing a lawsuit that alleges that Mountain Computer and NEC Corp., with which Mountain Computer has an OEM contract for some of its drives, used proprietary technology in the disk card. Plus also asked Mountain Computer to stop using the phrase "hard card" in its advertisements, which the company quietly did. NEC previously agreed to indemnify Mountain Computer in any suit. Neither company would comment further.

A developer of storage and backup systems, Mountain Computer hit the limelight about a year ago when it was quick to provide alternative hard disk drives for IBM's Personal Computer AT when that system suffered some reliability problems.

Similarly, when Mountain Computer caught drift of the kind of internal hard disk, its engineers leaped on the task. "Our hard disk on a card was actually developed in three hours in an afternoon," said Ron Rader, marketing communications manager.

He estimated the company has shipped some $8 million worth of hard cards, about 95% of which are 20M-byte systems, and said he expects the arrival of the 30M-byte system to bring the split to 50-50, with the smallest drive all but eliminated.

However, Plus' Hardcard takes one slot on an IBM PC, Personal Computer XT or 3270 Personal Computer, Compaq Computer Corp. systems and the AT&T Personal Computer 6300. Mountain Computer's hard-disk card takes up 1½ card slots, which are at a premium in some systems, or, if available, it takes up the first slot in the PC and PC XT, Rader said. Both the Mountain Computer Drivecard and Plus' Hardcard can also assume controller responsibilities for other hard disks.

"We want to sell to people who are doing fine with their system but have a flip-and-file of 40 or 50 floppy disks," Chesbrough said.

But shuffling dual-floppy PCs to less demanding tasks and buying new, complete systems was preferable as far as J. Todd Greeno was concerned. Greeno is manager of office technology for Pfizer Pharmaceuticals, a New York division of Pfizer, Inc.

"If your company is on a five-year depreciation schedule, you might have about depreciated the machine anyway," according to Greeno, who evaluated several hard disks on cards. "You might rather take that several thousand dollars and get a new machine." Still, he said, he was impressed with the cards' performance.

Bringing older machines up to speed is the single, limited use for hard-disk cards, because corporations are going for hard disks from the start now, said Robert Corr, director of technical services for Electronic Data Systems Corp.'s Pacific Operations in Detroit.

"One hundred percent of the machines we've bought recently have been hard-disk machines," he said. "I can't fathom a machine in a corporate environment that doesn't have a hard disk."

Frank Bryant, president and chief operating officer of independent retailer Neeco of New England in Needham, Mass., said he sells between 25 and 30 Drivecards monthly to corporate accounts, "and it's picking up each month." Bryant estimated that 85% of the Drivecard's buyers want to upgrade existing PCs, while the remainder are buying it along with initial PC purchases.

"We've gotten overwhemingly positive feedback," said Gordon Hoffstein, president of hardware distributor Microamerica in Marlboro, Mass. He credited easy installation, easy transport and price.

A few name brand disk makers also have joined the fray. Tandon Corp., in Chatsworth, Calif., in January released the $995 Businesscard 21, which takes 1½ slots but offers 21M bytes of storage. Western Digital Corp. also has announced its entry into the market; the rest of the participants are small companies, most of them dedicated to the hard disk on a card as a sole product.

Suppliers release standards plan

SEATTLE — Attempting to answer the cry for standards in compact disk read-only memory (CD-ROM) systems, an ad hoc group of vendors released its set of proposals for CD-ROM file structure standards in Seattle recently.

The High Sierra Group, chaired by Reference Technology, Inc.'s John Einberger, drew up proposals for a volume table of contents and directory structure for data formatted onto a CD-ROM disk. The proposals were announced at Microsoft Corp.'s CD-ROM conference. The proposed standards have been forwarded to the National Information Standards Organization, where they have been incorporated into draft form.

The High Sierra Group was formed in September and consists of representatives from Apple Computer, Inc., Digital Equipment Corp., Laserdata, Microsoft Corp., 3M Corp., TMS, Inc., Videotools, Xebec Corp. and Reference Technology.

— **Maura McEnaney**

The #1
3270 Alternative
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TELEX COMPUTER PRODUCTS, INC.

Software group offers catalog on one CD-ROM disk

Markets user-supported, public domain programs

By Douglas Barney

SUNNYVALE, Calif. — The Personal Computer Software Interest Group (PC-SIG), which claims to be the world's largest distributor of user-supported and public domain software, will offer its entire catalog of 479 programs to members on one compact disk read-only memory (CD-ROM) disk for $195. For users who want access to all quarterly program updates, the catalog is available for $395 per year.

PC-SIG chose CD-ROM technology as a means of lowering the cost of distributing programs to users and improving its updating and support services. The group will continue to distribute programs on floppy disks to its 15,000 members for $6 per program. "The point is just to get the programs out there," said Patrick Cox, director of marketing.

In addition to the software, PC-SIG is offering members a Hitachi Ltd. Compact Disk Reader for $995, which normally retails for $1,095 and which includes the software that allows the reader to plug into an IBM Personal Computer. "We are offering the reader basically as a service to our members," Cox said. Both the CD-ROM disk and the player will be available by April 15.

The total cost of the programs and the CD-ROM reader is $1,190 — far less than the more than $2,700 it would cost if programs were bought separately without the reader.

Observers agreed that the price of the reader is very aggressive. "Nine hundred and ninety-five dollars is the low end of what they can offer it at today," said Jan Lewis, president of the Palo Alto Research Group.

But Lewis was cautious as to the market for the PC-SIG system. "Heavy-duty hackers like to get things first and use 'freeware' anyway just on principle, but it is an awfully specialized market," she said.

"The response has been very good, mostly from institutional groups and user groups," Cox countered.

Both user-supported and public domain software are included in the CD-ROM disk. User-supported software is copyrighted and generally distributed the same way as public domain software, but customers are asked to make a donation to the author if they find the software satisfactory. Public domain software is not copyrighted, and the author has chosen not to seek royalty rights or formal rights to the work.

Membership costs $15 per year and includes the PC-SIG newsletter and a copy of its 350-page directory of programs, which is sold in bookstores for $8.95.

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Dectalk speaks to bank's needs

From page 31

the same information.

The bank also saves money. The entire system, which consists of a Microvax II and seven Dectalk units, costs $175,000. "It was done as a labor-saving technique. We saved approximately 10 clerical positions using the system," Jennings said. The bank is now considering loan balance and account balance systems for its retail clients, Jennings said.

There are other proposed uses for Dectalk, according to Ben Rosenberg, president of Advanced Systems Concepts, Inc. of Hoboken, N.J., which wrote the software for the Chemical Bank system. Advanced Systems has been discussing a parking violation credit check with several municipalities. Using this system, parking violators can get more information on their tickets and then pay for the ticket by keying in an American Express or Visa credit card number, with Dectalk guiding the person through the process.

DEC itself uses Dectalk as part of a sales order entry system, a field service system and as part of its electonic mail system, said Larry Drinkwater, marketing manager of voice products for the office and information systems group. Employees on the road can use a Touch-Tone phone to get text messages that are converted to speech through Dectalk. The system can also disseminate companywide messages without sending out individual memos.

DEC said it hopes new Dectalk products, announced last month, will spur more applications. The offerings include Dectalk on a board for systems integrators that can only support a single telephone line and a multiline Dectalk geared for a larger volume of users with eight independent Dectalk channels.

Multiline Dectalk offers large-volume users a cost savings. The original single-line Dectalk, which has been available since 1984, sells for $4,000 per unit and would cost more than $30,000 for eight simultaneous users if bought in individual units. Multiline Dectalk sells for $24,000 and serves eight users. The Dectalk board sells for $3,000.

DEC officials refused to disclose the number of Dectalk units sold.

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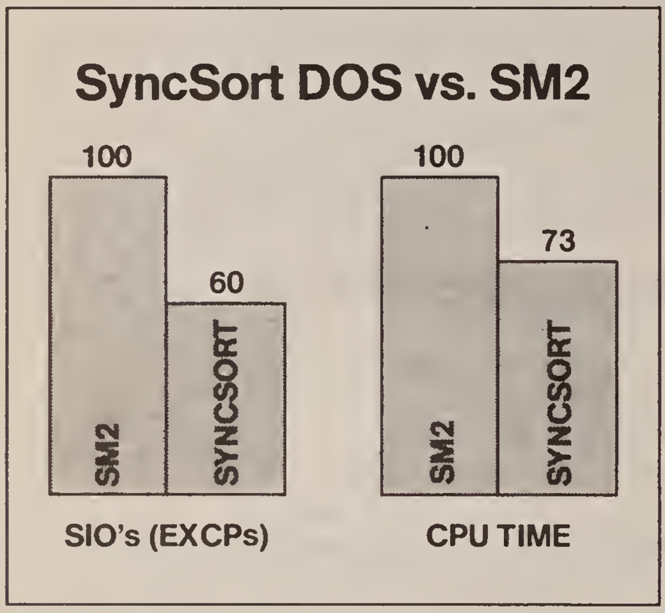

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SOFTWARE & SERVICES

SOFTALK
John Gallant

The cost of cutting prices

Some very knowledgeable people contend that the mainframe software industry is evolving into a sort of oligopoly, where a handful of large, powerful companies will control the bulk of the marketplace.

Observers point to the accelerated level of acquisition activity and to the financial problems many smaller companies have encountered of late as signs that consolidation is under way. They say the cost of entry to the mainframe software industry is becoming prohibitive, and saturation of many segments of the market is making it increasingly difficult for all but the giants to win the market share needed to remain profitable.

Perhaps one of the most unfortunate factors fueling the drive to consolidation is price cutting, insiders say. The bigger vendors have the resources to bankroll price cutting today, but it will be the users and the smaller companies who ultimately foot the bill for this destructive competition.

Some industry leaders say price cutting is no big deal. But smaller vendors already faced with plenty of obstacles to success have a different perspective on the problem. By nearly all accounts, price cutting is picking up steam. What used to happen only at the end of a quarter or fiscal year is happening with alarming regularity day after day, users and vendors report.

See **HIGH** page 50

Gallant, former Computerworld *senior editor, software & services, is managing editor of* Network World, *a new C.W. Communications, Inc. publication.*

A silky setup for mail order

Successful garment firm runs homespun software

By Donna Raimondi

CLIFTON, N.J. — In 1978, a gift shop owner decided to place a half-page ad in *Cosmopolitan* magazine for a $22 classic silk blouse. Three thousand buyers responded, and what would eventually become a $38 million mail-order enterprise in 1985 was off and running.

The company, Royal Silk Ltd., bought a Wang Laboratories, Inc. VS 80 six years ago to create an automated mail-order environment. After two upgrades, Royal Silk now has a VS 300 that serves more than 100 users. The company developed all but its Wang word processing software in-house. The homegrown software — written in Cobol and assembler routines — has become so sought after by other mail-order businesses that Royal Silk is in the process of marketing it through Yipkon Corp. in Fairfield, N.J.

The VS 300 is used for both word and data processing applications, including accounting, order capture and processing, label printing, invoices and reports. "We couldn't find packages that would adapt to our ever-changing requirements," said Kumar Hathiramani, vice-president for data processing, "so we created with our four programmers a system that could adapt and grow with our needs."

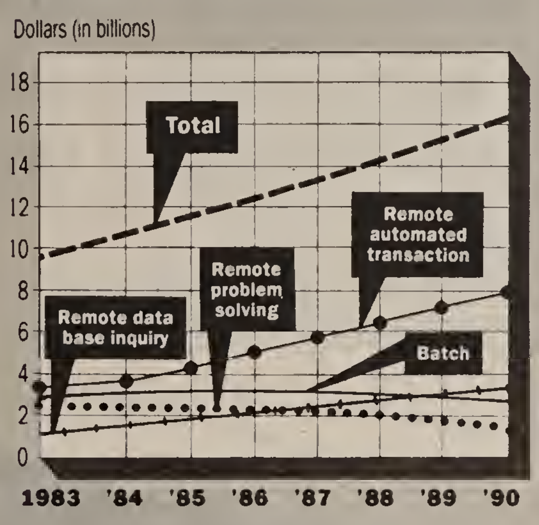
Through the Royal Silk system, orders that come in by telephone or mail are batched together, entered and validated against inventory files, source files — a code that tells the company where the customer's name came from — and accounting files. The files are updated on-line as the new orders are entered.

Customer names are kept on-line, so when data entry people put the orders in, if the name and the address are already there, other details such as telephone and credit card numbers appear immediately. Previous customers who have paid with bad checks or used other people's credit

See **GARMENT** page 48

DATA VIEW

Growth of processing services revenues by market sector, 1983-90



Source: International Data Corp.

MITCHELL J. HAYES

Ultimate sets Pick for IBM

By Eddy Goldberg

EAST HANOVER, N.J. — Ultimate Corp. recently agreed in principle to acquire IBM mainframe licensing rights for the Pick Systems' Pick operating environment from Systems Management, Inc., an IBM value-added remarketer based in Rosemont, Ill. Industry sources place the value of the deal at more than $5 million.

Under the agreement, Ultimate will acquire exclusive rights to implement Pick 370 on the IBM 4300 series and nonexclusive licensing rights for IBM 3080 and 3090 series computers. Pick can be installed as the primary operating system or can co-reside with the existing IBM 370 operating system, allowing the use of either or both.

Ultimate will also assume Systems Man-

See **ULTIMATE** page 45

INSIDE

IBM enhances Information/Systems and Information/Management, two components of its data management product line for MVS and VM systems/**44**

VM Systems Group provides multiprocessor support for V/Snap and V/Safe/**48**

NEW THIS WEEK

- Landmark Systems upgrades its Monitor for CICS
- For more on this and other new products, see pp. 103-124.

INSTANT ANALYSIS

"I hope the phone starts ringing again."
— Robert N. Goldman, ex-president, Cullinet Software, Inc., recalling how often he was approached by headhunters before becoming company president in 1983

The Fine Art of Information Management.

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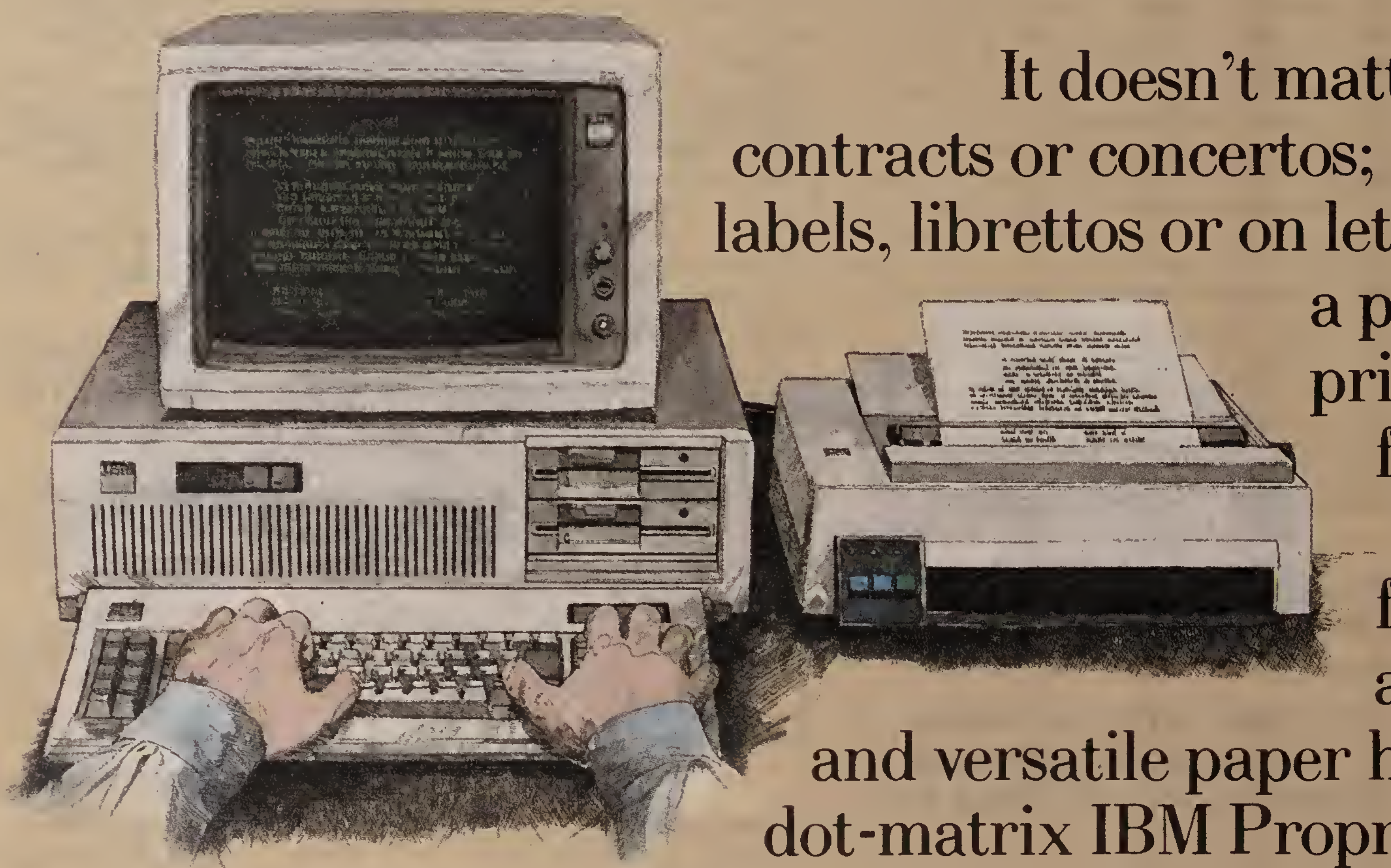

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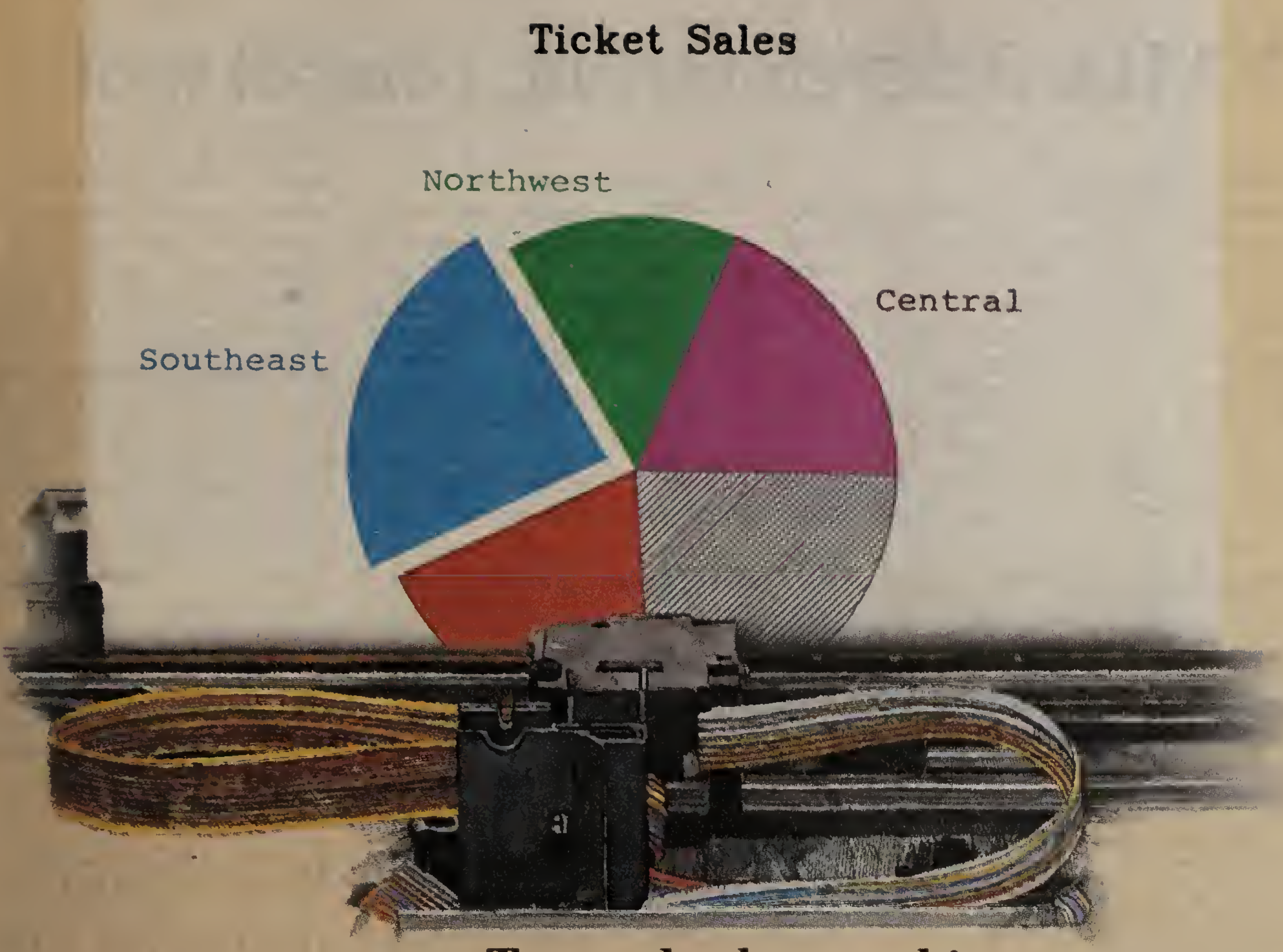

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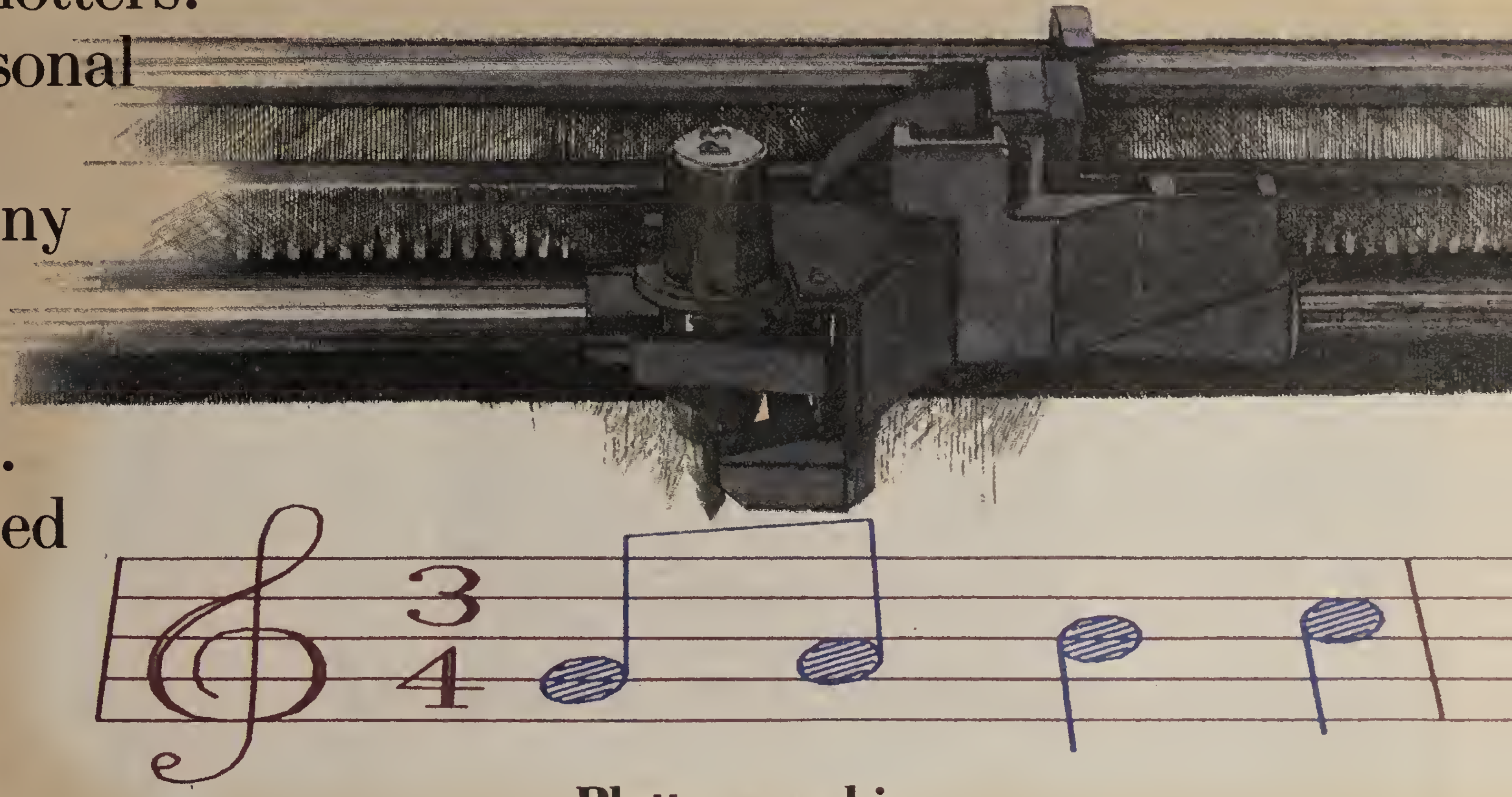

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Pansophic rolls out VMlib 3 development, control tool

Has user-defined development cycle

OAK BROOK, Ill. — Pansophic Systems, Inc. recently released VMlib 3, its program development and control tool for VM/CMS operating systems.

VMlib is used by program development and maintenance personnel to address library management and process control issues such as change control.

The major enhancement to VMlib is the user-defined development cycle, which provides management with the ability to implement as much or as little change control as needed, based on the needs of the user.

Enhancements to VMlib's reporting facilities include a Select subcommand that gives users an on-line, screen-driven method of selecting groups of VMlib elements for reporting, which allows users to select by specific value, generic value, range of values or generic range of values, according to the vendor.

VMlib 3 can be used as an extension to the company's Panvalet library system for VSE and MVS operating environments and fully supports the Include facility, through which users can capture program cross-reference information.

VMlib 3 is not compatible with any previous release, but it does include the programs and documentation required to convert from Releases 1.1 and 2. It is operational with VM/SP 2 and above.

More than 200 installations

VMlib has more than 200 installations, according to marketing product manager Ken Bodnar.

Users with current maintenance agreements can receive the new release free by contacting Pansophic.

The price for Release 3, depending on configuration, is from $12,500 to $24,500.

— Eddy Goldberg

Info/Family upgrades offer one-time fee

By Rosemary Hamilton

RYE BROOK, N.Y. — IBM recently announced new versions of two components in its data management product line, Info/Family, that run under the MVS and VM operating systems on the IBM System/370 processors.

The enhanced versions of both Information/System, the base product in this line, and Information/Management, a productivity tool for controlling data management problems, will be offered with the option of a one-time purchase fee or the traditional monthly license fee.

Prior to Sept. 30, customers can purchase Information/System Version 3 for $8,000 and Information/Management Version 3 for $8,800.

After Oct. 1, the one-time cost for Information/System will be $10,000, and Information/Management will be priced at $11,000.

The monthly fee for Information/System is $450, and the monthly charge for Information/Management is $500.

At the core

As the core product of the Info/Family, Information/System provides the mechanism for loading, searching, reviewing and reporting

See **INFO/FAMILY** page 45

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Ultimate sets Pick for IBM

From page 41

agement's IBM-related business operations and take over as a value-added remarketer for the 4300 series. The deal is expected to be completed within the next two weeks.

Pick Systems already has approved the transfer of Systems Management's Pick license to Ultimate.

"The significance of this event is that the support and promotion of Pick 370 is being transferred from a relatively small company to a larger corporation with the financial and personnel resources to more strongly penetrate the marketplace," said Richard K. Lauer, vice-president of marketing and sales at Pick.

"Ultimate is a much bigger, much more credible company selling a product into the Fortune 500 market, where that is a real issue," he added.

Lauer said that although 60,000 Pick systems are installed, they are largely on non-IBM machines, with less than 100 on IBM mainframes. He predicted an immediate surge in Pick 370 sales now that DP managers can feel more comfortable dealing with a larger company.

Ultimate reported nearly $40 million in revenue in its last quarter, while Systems Management had an annual revenue of about $20 million.

IBM shops are interested in Pick 370 for a number of reasons, Lauer claimed. He cited the 1,500 to 2,000 application packages built around Pick's relational data base management system functionality, and he also mentioned its portability.

"You could run the same application software on the IBM PC XT, the Series 1 and the 4300 with literally no changes," he said. This allows an IBM shop to have a common operating environment.

Lauer said Pick 370 also offers a fourth-generation environment for developing new applications.

Info/Family upgrades out

From page 44

data, IBM said.

The latest version has new documentation and supports larger data bases. Version 2 accommodates up to 256K bytes of data records, whereas Version 3 will support a device-dependent limit, according to a spokeswoman.

Used on a 3380 system, for instance, Version 3 can handle up to 4.5 million data records .

Version 3 also includes support for the new version of Information/Management, which helps Information/System manage changes, problems and component configurations.

It reportedly allows users to create, display, update, print and delete records.

Includes inventory control

The enhanced version includes an inventory control capability, a financial management capability that accommodates additional financial information and configuration connectivity enhancements such as physical and logical connectivity and multiple configurations, according to IBM.

Version 3 of both programs running under MVS is currently available, the company said.

VM versions are scheduled for shipment in the second quarter.

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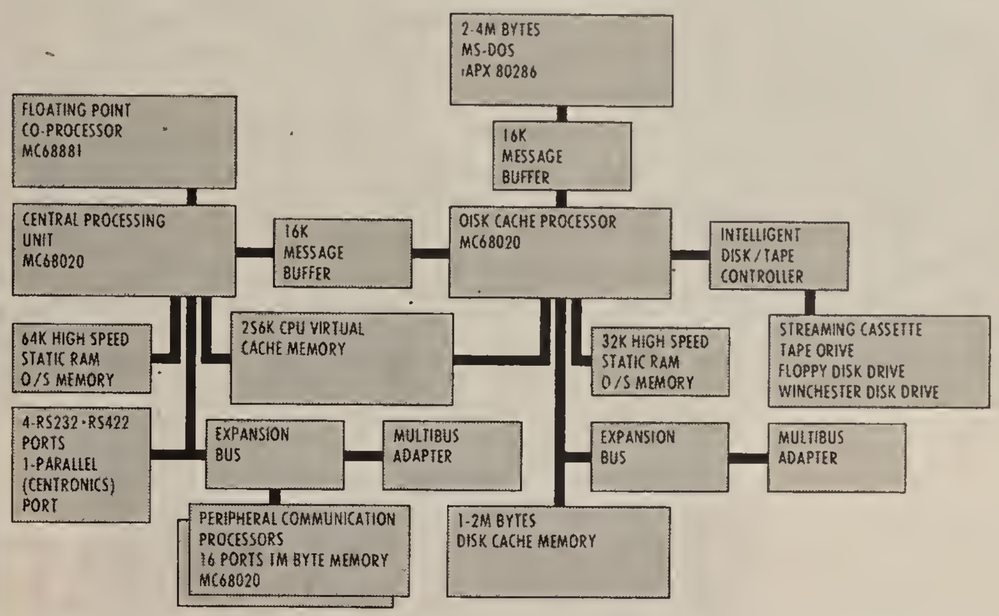
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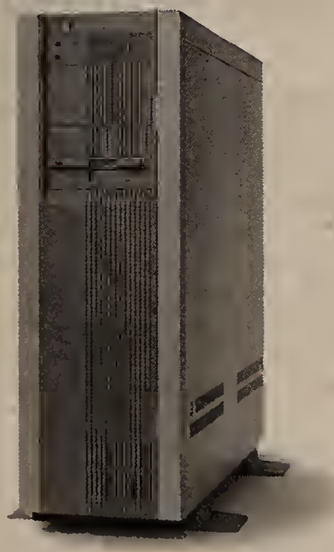

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Garment firm's homespun tool

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card numbers are flagged.

Credit card information from the orders is sent via ASCII modems to the company's bank — Citibank, a subsidiary of Citicorp — Hathiramani said. The bank checks out the credit information and, usually in one or two hours, sends back to Royal Silk a list of credit applications that should be rejected.

"Then we update our master file and start processing. We print out invoices; we print out cards if the goods are on back order," Hathiramani said.

Invoices are grouped together and a United Parcel Service (UPS) manifest is generated through the system. When an order is placed, the computer already knows what size box it will require. The system also knows which brochures or instructions will go into that box, how much the box and its contents weigh and the cost of the postage. It prints the postage on the shipping label and summarizes all charges by ZIP code. "Then we print out a sheet for UPS, and UPS uses that sheet to bill us," Hathiramani said.

Alternative systems complicated

"People tried to sell us weighing scales and assembly lines where the package would go along this assembly line and go automatically onto the weighing machine, and the machine would weigh it and then print out a label and so on, and it was very complicated," Hathiramani said. "We skipped all of those steps by developing a very simple matrix using the UPS tables. The programmers were also able to come up with a formula to work out weights for multiple garments of various fabrics shipped together, he said.

Royal Silk mails out one million to two million catalogs at a time. Names are purchased from retailers such as Bloomingdale's, Saks Fifth Avenue, Banana Republic and The Gap stores. "We track which lists the people who are ordering are coming from, or track if they are coming from our own list," Hathiramani said. That way, the company finds out which lists are the most profitable for them, and from which lists they should rent more names. That information is captured on a daily basis, and the file is constantly updated.

Catalogs are mailed over a period of weeks, with responses coming in for about 60 days after the mailing. From the responses that come in over the first two to four days, the company can forecast accurately which items will sell most and least between that period and the end of the life of the catalog, Hathiramani said. "This mathematical package is very, very accurate. We change our ordering techniques based on those results." Before, the company was either overstocked or understocked, he added, which hurt both the company and its relationship with customers.

The system also keeps tabs on how many times each customer orders from Royal Silk over one-, two- and three-year periods by doing a match code on names and addresses. This gives the company a good idea of whom to target with its promotions.

Viewtron puts Silk on screen

As part of its committment to leave no technology unturned in order to pile up profits, Royal Silk Ltd. became one of the charter subscribers of the Knight-Ridder Newspapers, Inc.'s Viewtron videotex service.

"We were the first catalog house on Viewtron, in October of 1983," said Gerry Pike, vice-president of the garment company that went from nothing to $38 million a year in six years.

Customers of Viewtron have access to Royal Silk messages via a number of cross-referenced sections, including categories such as "catalogs," "specialty items" and "clothing."

The company averages 27 or 28 orders per month through the videotex service, so it is not really cost-effective yet, Pike said.

"We see Viewtron as a research and development investment," Pike said.

"I have faith that this kind of technology can be part of people's everyday life," he added.

VM Systems adds processor support

ARLINGTON, Va. — VM Systems Group, Inc. recently announced multiprocessor, attached processor and dyadic support for its V/Snap and V/Safe products operating on the VM operating system for IBM and compatible mainframes.

V/Snap creates a system dump spool file for analyzing degradation problems and storage management errors.

V/Safe, which requires the V/Snap product to be installed concurrently, catches control program abend conditions and continues normal operation so most users are unaware of the failure.

The multiprocessor, attached processor or dyadic support features are priced separately, starting at $1,600 for a one-year license in addition to the license fees for V/Snap and V/Safe.

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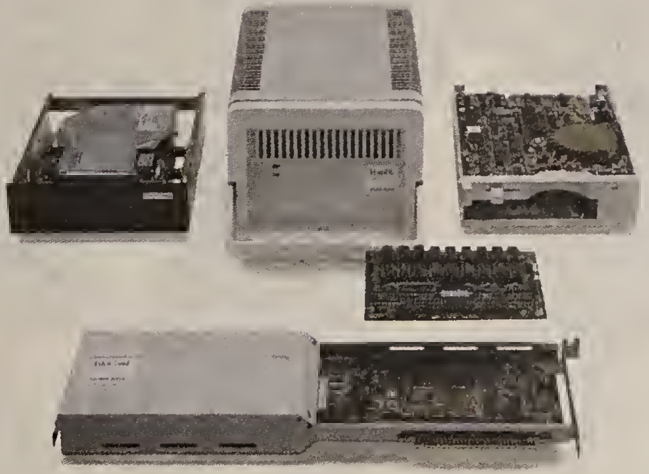

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The high cost of price cuts

From page 41

Pressured by financial industry watchdogs to perform according to plan, vendors are trashing list prices to swing sales. As if price cutting alone were not enough of a problem, vendors are also tossing in additional products and maintenance contracts at no cost. Not only are those vendors muscling out smaller players, they are putting their own financial futures in jeopardy.

What is really fueling price cutting? The easy answer is that price cutting is due to diminished growth owing to market saturation and general economic malaise. But on deeper analysis, a more worrisome cause becomes apparent — aging technologies.

If there is a critical factor spurring price cutting, insiders say, it is that many key, powerful vendors are sitting on aging product lines that must be very attractively priced to move. Aging technology and price cutting combine to set in motion a vicious cycle.

As products age, rather than taking the cost bite for a few years and devoting additional resources to research and development, vendors make the products appear more competitive by trimming prices. Lower prices mean lower revenue and less pie to be divided up for areas like support and R&D. That weakens the product line even more and fuels deeper price cuts, and so on and so on.

Hold on, many vendors are probably saying right now. Can anyone point to a specific instance of a vendor or user being hurt by price cutting? Hold on yourselves, users should say in return. That is a dangerous defense. The cause-and-effect relationship between price cutting and damage to a vendor or the industry is not a straightforward one.

It would be difficult, for example, to prove that price wars led to the diminished profits many former Wall Street wonders experienced last year. It would be difficult to prove that price slashing caused some smaller vendors to stumble. But it would also be difficult to prove that price cutting did not play a role in those events. And, if the damage caused by price cutting become clear only in the future, it will be too late.

As a user, you might be tempted to say, "So what? If I can benefit today from this price competition, if I can shave a few thousand bucks from my software expenditures, what's wrong with that?" Well, in one sense, that view is absolutely correct. If a vendor chooses to compete on price rather than product, why not take advantage of it?

But in the long run, it is the user who will pay. If smaller companies — very often the companies with the most innovative products — are pushed out of the market and if the oligopolists that remain are more concerned with battling each other on price tags rather than innovation, the user will lose out on new software technologies. At the very least, the user will have to wait a good deal longer for advances to hit the market. The vitality of the market is closely tied to the level of product competition. And the vitality of user organizations is closely tied to the quality of the software available.

The user's role

What can a user do? Perhaps it is ultimately up to the big software companies to take a stand on price cutting. Certainly, if one or two of the giants held firm to realistic list prices, they could stop or slow the trend. But users can have a hand in quelling price cutting.

The next time a vendor offers you a substantial price reduction, or additional free software or other enticements, step back and think. Why would a vendor with a sound, quality product have to resort to this to make a sale? Ask the vendor. If his software is as good as he says, if it can carry your company into the future, if he has priced it fairly and accurately, why does he have to take these steps to win your business?

Maybe price cutting is not a big issue today. But wouldn't it be better to stop it before it becomes one? If you think price cutting is a useful tactic or if you feel you benefit from unhealthy price competition, remember, there is no free lunch.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

Dropping the upgrade bomb

The lights glare, the music blares, the executives crow, and the sales force, armed with a fresh pitch, hits the street. New product announcements are meant for the world to hear.

The degree of flash and splash that surrounds a product introduction varies with the company and with the product. But even if the "Lights, camera, action" is missing, most computer companies tell their customers that the latest product is their salvation, a panacea for backlogs, traffic jams, rotten response times and the common cold. One assumes that the new box or program will do everything that earlier products could not accomplish, even products from the same vendor who is tooting his own horn.

But does anyone know what happens to those earlier products, the ones that were such hot stuff two years earlier? Where are the lights and music when, as some observers like to say, it is "boat anchor time"? Tie a chain around that old tape drive and let it interface with the ocean floor for the summer.

Rather than making a grandiose announcement that the $100,000 or $5 million unit purchased a few years ago is obsolete, vendors let the word slide out. It is true that technology advances and that new products usually can do the same job better than the old systems, and most vendors do ensure that everyone knows that their products have reached the end of their line.

But too often the road to obsolescence is scarred by bombshells, bombs

See **DROPPING** page 58

Connolly is Computerworld's *senior editor, systems & peripherals.*

Best/AOS for PCs debuts

Mohawk proposes sale of five MDS divisions

By James Connolly

HAYWARD, Calif. — Minicomputer manufacturer MDS Qantel last week announced that it is making its Best/AOS operating system available for microcomputers, a move that the company said it hopes will encourage customers to migrate from personal computers to Qantel's minicomputer line.

At the same time, Qantel's parent company, Mohawk Data Sciences Corp. (MDS), announced that it has proposed the sale of five MDS divisions to a consortium of Los Angeles venture capitalists for $180 million, leaving Qantel as the remaining entity of MDS. The sale issue will be voted on at MDS' shareholders' meeting April 15. MDS lost $181.2 million on revenue of $362.9 million in fiscal 1985.

Best/AOS, which has been in use at 10,000 Qantel installations, is being updated to run on the IBM Personal Computer and compatible systems.

A company spokesman said the personal computer version of the operating system, like other Qantel products, will be sold through 75 value-added dealers and that the recommended end-user price will be between $800 and $900. A controller board allowing multiuser access to Best/AOS programs on the personal computer will cost about the same. Both products will be available by early June.

"The new Best/AOS systems allow any software written for a Qantel system to be run in the PC environment with minimal changes. This is extremely significant in light of the large quantity of business software written for Qantel systems. These applications, available until now only at the mini or superminicomputer level, now are available to the smallest first-time user," said Karl Niemuller, senior vice-president of marketing at Qantel.

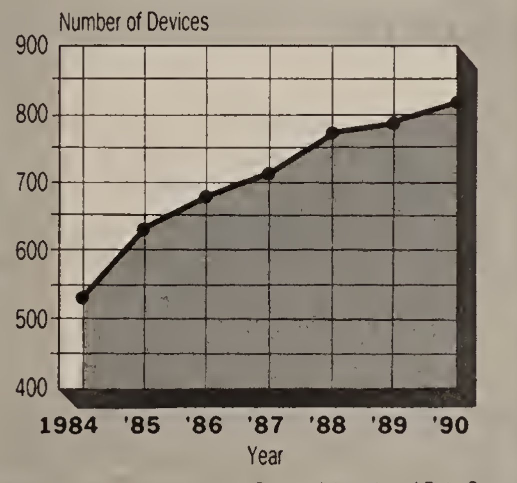
However, the microcomputer user running Best/AOS will be unable to switch between operating systems without shutting down the system and rebooting to run IBM PC-DOS or Microsoft Corp. MS-DOS.

The company said that one of the key markets for the microcomputer version of the operating system will be customers

See **BEST/AOS** page 55

DATA VIEW

IBM 3270 display market: Shipment outlook



Source: International Data Corp.

Spectragraphics DS 1082GX out

By James Connolly

SAN DIEGO — Spectragraphics Corp. has reacted to IBM's Jan. 21 introduction of its RT Personal Computer workstation with a new model of its own Designset 1080 color graphics workstation.

The DS 1082GX reportedly incorporates design changes intended to improve total graphics throughput with new transformation hardware and pixel generation at 8 nsec for horizontal vectors and filled polygons.

According to Spectragraphics, the workstation provides compatibility with the new model of the IBM 5080 graphics system, the 5080 Model 2, which was announced with the RT PC.

See **SPECTRAGRAPHICS** page 58

INSIDE

Aquidneck Data unveils an optical disk storage system for DEC VAX systems/**52**

Liberty Electronics USA introduces its latest ASCII terminal/**52**

CGX offers two enhanced IBM 5080-compatible workstations/**54**

Eastman Kodak announces a lower cost electronic publishing system/**54**

NEW THIS WEEK

- GE Calma offers the Logic Series CAE/CAT systems
- For more on this and other new products, see pp. 103-129.

INSTANT ANALYSIS

"Things like the DEC VAX 11/780 are, in fact, no longer on our performance charts."

— **Samuel Fuller, vice-president, research and architecture, Digital Equipment Corp.**

TI unveils 32-bit mini series

Enhanced Unix system supports up to 128 users

By James A. Martin

DALLAS — Texas Instruments, Inc. last week announced the Business System 1500, a series of 32-bit multiprocessor minicomputers said to offer an enhanced Unix operating system that supports up to 128 users and 4G bytes of memory address space.

The 1500, which will be available in nine models, was unveiled at the first VAR Congress sponsored by tenants of the Dallas Infomart.

A low-end configuration of the 1500 features two 32-bit Motorola, Inc. 68020 central microprocessing unit chips running at 16.67 MHz. Higher end models feature four microprocessors and support up to 128 users through a network terminal concentrator with twisted-pair cabling or the Ethernet local-area network.

TI's System V operating system is said to meet the AT&T Unix System V standard, along with providing several enhancements. "We still have the kernel of the pure Unix," said Raymond E. Hartfield, market development manager for TI's Network Computer Systems Division: "But we built our own custom shell around it to optimize Unix in the commercial environment. Because most companies offer systems that only support up to 30 or 40 users on Unix, we

See **TI** page 55

HARDWARE NOTES

IBM donates $24 million

IBM has donated $24 million in cash and equipment to 12 universities involved in the field of materials and processing science. The donations of up to $1 million in cash and $1 million in IBM hardware and software for each school will support research in three areas — polymers, processing and packaging. The research will focus on the properties, composition, structure, processing and applications of materials can help to produce faster, smaller, more efficient systems that are easier to use.

The schools, selected from 100 schools that submitted research proposals last year, are **Brown University**, **Carnegie-Mellon University**, **Columbia University**, **Cornell University**, **Massachusetts Institute of Technology**, the **University of Massachusetts at Amherst**, **Pennsylvania State University**, the **University of Chicago**, the **University of Illinois at Champaign/Urbana**, the **University of Minnesota at Minneapolis**, the **University of Pennsylvania**, and the **University of Washington**.

■

NEC Electronics, Inc. claims to have developed the first 32-bit

See **NOTES** page 57

Liberty unit to fill gap between two markets

Entry-level terminal boasts full features

By James Connolly

SAN FRANCISCO — A terminals maker that reorganized its engineering, manufacturing, marketing and service operations after experiencing flat growth between 1984 and 1985 introduced last week an ASCII terminal that it said will provide full-feature functionality at a near-entry-level price.

Liberty Electronics USA announced its Freedom One terminal with a list price of $449. Company officials said the terminal, intended to fill a gap between the entry-level and full-feature markets, costs slightly more than most entry-level ASCII terminals but provides the functionality of higher priced terminals such as the Wyse Technology, Inc. WY50+.

The company said that improvements over its earlier Freedom 200 include a smaller pedestal, a smaller overall profile, a flatter screen, greater tilt-and-swivel ranges, a front-mounted brightness control, 44 user-programmable keys, 132 columns, double-high and double-wide characters, a 38.4 bit/sec. main port, two types of handshaking, block-mode programmability and a buffered, bidirectional auxiliary port.

The terminal is scheduled to be available in April.

Liberty said it will continue to market the Freedom 200 and Freedom 110 ASCII terminals as well as its line of voice and data terminals and Digital Equipment Corp.-compatible ANSI-based terminals.

Liberty, which International Data Corp. ranked 10th in ASCII terminal market share with 3.4% in 1984, has its corporate headquarters and some of its engineering facilities in San Francisco. Other engineering and manufacturing is done in Taiwan. The company, founded in 1982, sells about 30% of its products through distributors, 30% through OEMs, 15% through value-added resellers and 25% to user companies.

DEC VAX gets optical archival tool

By Donna Raimondi

MIDDLETOWN, R.I. — Aquidneck Data Corp. has rolled out an optical disk archival system for Digital Equipment Corp. VAX series machines.

The Optical Archiving System (OAS) 4300 is said to be useful for storage of engineering drawings, tape library replacement, mass-storage substitute and magnetic tape backup.

The product emulates Pertec Peripherals Corp. tape drives and costs $38,500 or $39,500, depending upon whether it comes with a cabinet. Volume pricing is available.

"As far as I know, there is nothing else optical out there for the VAX," said data storage analyst Dave Vellante of International Data Corp. The Pertec is an industry standard that probably will allow the Aquidneck product to work on other vendors' minicomputers as well as DEC's, he added.

The unit will alleviate operator involvement such as loading and unloading tapes and could become popular for that reason, he said.

Vellante warned that DEC has made it impossible for third-party vendors to hang their equipment off a Vaxcluster but he added that many stand-alone VAX users might find the product useful. "I have had a lot of questions from users who want to hang optical disks off their VAXs," he added.

"We want to establish now that we have a viable product," said Aquidneck spokesman Douglas Davis.

The company said it hopes to alert manufacturers and distributors to the fact that optical disk systems are profitable products, he said, adding that his company is pursuing value-added reseller and distributor arrangments.

The unit includes a 12-in. optical disk drive, a proprietary Magnetic Tape Emulation Controller device with software and one 1G-byte optical disk.

It will be available in June.

Operates in three application modes

The OAS 4300 operates in three application modes: on-line, off-line and pass-through. In on-line mode, it appears to the host as a tape formatter and drive. When archiving takes place, the data is written to optical disk instead of to tape. It interfaces to any Pertec-type tape controller over the two standard I/O cables, and it accepts standard I/O commands.

In off-line mode, the user controls tape-to-disk and disk-to-tape data transfers. The operator can copy an entire tape, record between file marks or a specific number of records. The user can also display the directory, compare disk and tape data for copy verification and restore a tape that has been copied to disk.

The pass-through mode allows the host computer to continue existing tape read and write operations in addition to new optical-storage-based operations.

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CGX unveils graphics workstations

By Stanley Gibson

ACTON, Mass. — Responding to the competitive challenge posed by the IBM 5080 workstation series, CGX Corp. recently announced two 5080-compatible graphics workstations that it claims offer greater performance for less cost than the IBM machines.

The CGX workstations, the 2033 Model 1A and 2033 Model 2, are additions to the CGX 2030 color raster series of graphics workstations introduced in August 1985.

CGX said that all currently installed 2030 series workstations can be upgraded to the Model 1A and Model 2 configurations and that the 2033 model can attach to an existing CGX network. The workstations will be available for delivery in May 1986.

For IBM CAD/CAM mart

CGX's graphics workstations were designed for the IBM mainframe-based, computer-aided design and manufacturing marketplace. Its products enable engineers to transform concepts into designs for products ranging from printed-circuit boards to airplanes.

New features on the 2033 workstations include Supercheck, which allows users to identify occurrences of coincident, intersecting or overlapping geometries in a design and make changes to them.

In addition, the 2033 models also offer compatibility with the advanced IBM 5080 instruction set, providing Boolean pixel operations, convex area fills, indirect data lists and preselect highlighting.

Features 32 function keys

The workstations also feature GCX's Advanced User Interface Program, which provides 32 assignable, programmable function keys. The products also provide a 45-nsec pixel write time, 2.5M bytes of system memory and 32,768 colors, with the number of shades for each primary color doubled to 32.

The base price for the 2033 Model 1A is $19,400, and the 2033 Model 2 starts at $20,900.

Founded in 1981, privately held CGX has raised $12.9 million in venture capital from a number of different investors.

The workstation maker said that by the end of 1985 it had installed 1,000 displays and over 100 networks in major companies throughout the world.

Kodak offers lower priced version of KEEPS

Latest version has fewer ports

By James Connolly

ROCHESTER, N.Y. — Eastman Kodak Co. has announced a lower cost version of its Kodak Ektaprint Electronic Publishing System (KEEPS), designed to allow easier cost-justification of a stand-alone KEEPS configuration.

The Kodak Ektaprint 1102/71 document composition station allows merging of graphics and text in various sizes and fonts on a high-resolution screen for output to a laser printer, Kodak said.

The workstation costs $28,000 — which is said to be 25% less than other Kodak systems — but comes with fewer communications ports and an integrated desktop file server.

The 1102/71 includes the Kodak Ektaprint 1102 document composition station and the Kodak Ektaprint 1602/71 desktop file server.

It has a 1,152- by 900-pixel, bit-mapped, monochrome screen with low-profile keyboard, a mouse, 2M bytes of physical memory, two RS-432 serial ports and a 71M-byte formatted hard disk drive, according to the vendor.

The system runs University of California at Berkeley Unix 4.2 and Kodak's composition software.

TI unveils mini series

From page 51

wanted to provide an alternative. The Unix market deserves a grown-up computer."

TI's System V is said to include a menu-driven Unix interface, automatic writing of memory I/O buffers to disk, temporary record locking to coordinate concurrent file updates and to provide data protection and an improved file management system called T-ISAM. Initial languages supported include Cobol, Pascal, C and Motorola 68000 assembly language. A Cobol V programming language provides a compatible Cobol environment between the 1500 and TI's Microsoft Corp. Xenix-based Business-Pro microcomputer.

The 1500 models are the first of TI's new Business System 1000 minicomputers and will "extend the company's computer line of Business System 300, 600, 800 and 900 minicomputers," TI said.

Each processor board uses 256K bytes of dynamic random-access memory (RAM) chips and advanced surface-mount technology to provide 2M bytes of on-board dynamic RAM. An add-on memory board can boost memory to 4M bytes for each processor board.

The multiple processors plug directly into a 32-bit TI Nubus that allows the processors to share the system load. The Nubus has a 37.5M byte/sec. transfer rate with a 100-nsec clock speed, and it provides a full 32-bit path for both physical memory and data transfer and a virtual address space of 4G bytes.

The 1500 can provide up to 3.6G bytes of mass storage using two types of intelligent controller boards that plug into the Nubus chassis, a small computer systems interface (SCSI) board and a dual-ported mass storage controller board combining a SCSI interface with a Storage Module Drive interface.

The 1500 supports TI's Model 931 VDTs as well as the 924 model, which was also introduced last week and retails for $795. TI's series of microcomputers and the Business-Pro can be used as terminals via terminal emulation. Up to 16 terminals can be connected to a terminal concentrator with a single Ethernet cable link to the 1500.

The 1500 is scheduled to ship in September.

The basic configuration, with two processors performing 4 million instructions per second (MIPS) and featuring 4M bytes of RAM, retails for $70,000. A high-end model has 68020 processors performing 8 MIPS and features 8M bytes of RAM for $408,765. A terminal concentrator retails for $20,000.

Best/AOS out for PCs

From page 51

who run Qantel minicomputers in their main offices but run personal computers in branch locations.

Niemuller noted that while some minicomputer vendors have suffered because of the impact of the personal computer, there remains a gap between the personal computer and the mainframe that the minicomputer can fill. He cited examples of companies that are too large to be run with microcomputers but too small to run mainframes, including printing companies, retailers, manufacturers, distributors, direct mail merchandisers, fuel oil distributors, car rental companies and hotels.

He said that mature Qantel applications that are now available to the personal computer user include the Qantel Manufacturing Resource Planning package, the Hospitality and Leisure System hotel and resort management package and the QARS retail accounting system.

Qantel, established in 1969, was acquired by MDS in 1980.

Company officials said Qantel will continue to manufacture hardware and software products after the five-division divestiture, which they said will provide Qantel with the revenue needed to market their minicomputer systems.

In January, Qantel added four processors to its line of 16-bit and 64-bit minicomputers, raising to 150 the maximum number of users supported on the systems.

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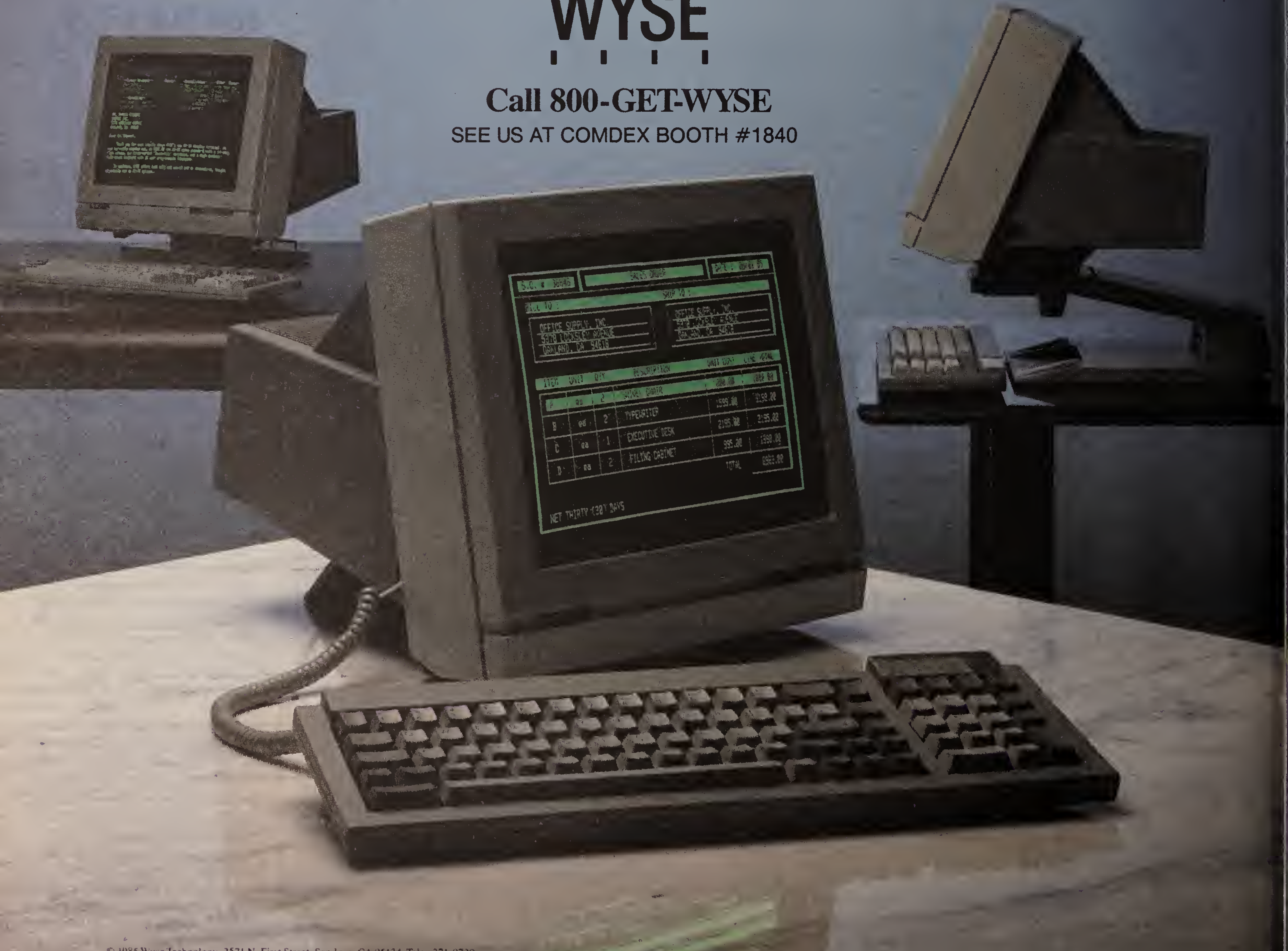

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Notes: Toshiba has 1M-bit chip

From page 51

CMOS floating-point digital signal processor, the **UPD 77230**.

The device reportedly has a full on-chip 32-bit floating-point architecture with a 55-bit floating-point multiplier executing an instruction cycle in 150 nsec.

The UPD 77230 is intended for use in numeric array processors, image processing, graphics engines, telecommunications and general-purpose digital filtering.

■

Toshiba America, Inc. claimed it has developed the first 1M-bit "virtually static" random-access memory (VSRAM) chip.

The **VSRAM** reportedly uses new function circuits to perform refresh operations automatically. Toshiba says the chip can store more than 130,000 alphanumeric characters.

Samples will be available in about a year, according to company officials.

■

Three-year-old **Celerity Computing, Inc.** has signed a $3 million agreement with the **West German** firm **GEI Rechner Systeme**.

San Diego-based Celerity will supply processor and board components of its **C1230** parallel computer over a two-year period.

Celerity, which claims to have made $5 million in sales during its first year, markets to the mechanical design and animation industries; GEI markets to the West German automotive industry.

■

The independent **Wang Users' Society of America** (WUSA), an alternative to the **Wang Laboratories, Inc.**-sanctioned **International Society of Wang Users** (ISWU), is now based at P.O. Box 174, De Kalb, Ill. 60115.

WUSA founder **Hank Berkley** said the group is complementary to and not in opposition to Wang's official organization.

It was started, Berkley said, to provide services to users that Wang would not be expected to offer, such as information on third-party vendors.

Last year WUSA hosted its **Index '85** third-party show concurrently with Wang's official **ISWU** conference in **Boston**, a practice it intends to continue in 1986.

Index '86 will have seminars on topics raised by WUSA members.

■

Prime Computer, Inc., which hired 800 people worldwide during 1985, plans to add another 1,500 in 1986, said **President** and **Chief Executive Officer Joe M. Henson**.

The company surprised the industry by growing 20% last year when almost all the computer companies were sliding.

Prime is aggressively pursuing high-growth vertical markets, especially the scientific workstation arena, in its bid to continue its growth spurt.

■

Cybercredit Financial Systems, a division of **Control Data Corp.**, will market **Davox Corp.**'s integrated voice/data workstation systems in conjunction with Cybercredit's on-line collection systems under a recent OEM agreement. The workstations are based on the **IBM 3270**.

■

General Automation, Inc. said that it has installed 71 of its **Zebra** supermicrocomputers throughout the **UK** for the **National Health Service**.

An official for the health service said that in addition to the $3 million worth of computers already delivered, the agency expects to install another 30 systems during the next three to six months.

The systems are being used for applications related to manpower and personnel management, supplies, patient records, hospital services and credit.

The Zebra is based on the **Motorola, Inc. 68000** microprocessor and runs the **Pick Systems' Pick** operating system.

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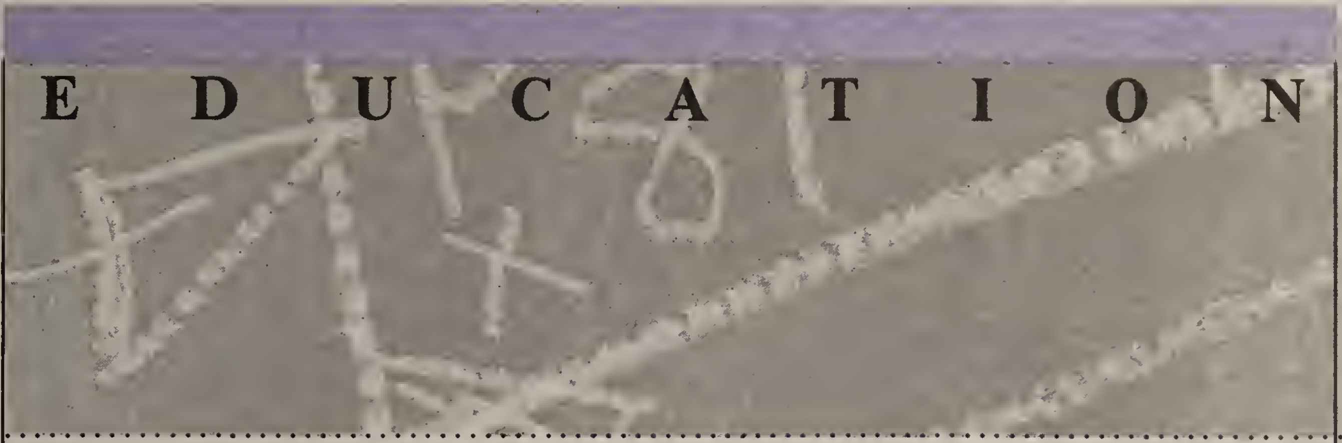

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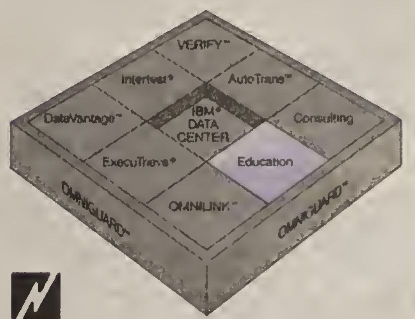

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Dropping the upgrade bomb

From page 51

that fell on the same loyal suckers who keep buying the bombardier's products.

The company most often criticized for dropping bombs is IBM. The firm is adamant in its refusal to discuss unannounced products, which it usually interprets to mean any possible path a product line or a technology might take. The exceptions are its updates on its semiconductor developments — which are usually too far removed from everyday products to help a user plan a management strategy — and the advance product briefings that a few key customers receive, at least on an informal basis.

Therefore, System/34 users saw their equipment values plummet when the System/36 was announced, and 4381 owners who bought machines in January saw their systems' values slashed by the new line of 4381s introduced in February.

One thing that can be said for IBM, however, is that it seems to wait a healthy period of time before dropping software and maintenance support for its older products. IBM, like many other vendors, often lets word of an actual discontinuance drift out through an often haphazard notification procedure in which some users receive a letter and others hear the news from other users.

Sperry Corp. notified users by osmosis when the company changed the way that it treats third-party CPU sales and operating system license transfers. Some users did not find out until they tried to buy or sell a mainframe.

One of the most recent examples of a company letting word leak out in connection with how an older product is to be treated was the case of the Burroughs Corp. 207 series of disk drives.

Burroughs stunned some dealers and users with a letter sent to dealers, the gist of which filtered down to users. The letter outlined a policy change that users and dealers felt would make it more difficult to obtain certification for maintenance when a drive was moved or resold. That policy has since been amended, but the people who were looking to buy or sell 207s on the used market interpreted the original change as a killing blow to the 207's resale value.

The policy change, and the questions that it raised, provoked enough concern for the Burroughs user group Cube, Inc. to place the issue on its agenda for a meeting this week.

Some 207 owners complained that a design flaw in the 207 almost assured that anyone moving a drive would have to pay up to $7,000 for new data modules. Other owners charged that it was too soon after the 207 was removed from the new equipment market— less than two years —to cut back on support.

But of greater concern to users who were interviewed about the policy change was the fact that Burroughs never told them and that they learned about it through dealers or through the news media.

Getting second-hand information makes it tough to do business in an already-tough DP world. It seems particularly unfair when one considers the hoopla that surrounds products when they are introduced. There was no shortage of Burroughs executives available to comment two weeks ago when the Detroit company introduced new mainframe communications products.

Burroughs, IBM, Sperry and the other vendors must remember the people in their user companies who are content to use older technologies, and that not everyone can afford every new product that comes along. Some user companies are enduring even harsher times than is the computer industry.

Those people who can do their basic jobs with a 2-year-old or a 10-year-old box deserve as much consideration as do the people whose business growths let them line up for IBM 3090s or Burroughs A15s months before they are introduced.

Spectragraphics DS 1082GX out

From page 51

The existing DS 1080 can be upgraded to the DS 1082GX, according to Ray M. Barger, vice-president of marketing and sales for Spectragraphics.

"This is quite significant in light of IBM's decision not to make their old Model 1 and the new Model 1A 5080 workstations upgradable to Model 2 functionality. Our flexible systems architecture allows us to continue upgrading our customers' workstations as technology advances. This means that users who choose lower priced DS 1080 models for present needs will be able to upgrade to the GX when their applications require the additional functionality," Barger said.

He noted that the RT PC's support for the 5080 will help Spectragraphics as a supplier of 5080 emulation workstations.

The DS 1082GX supports the features found on the DS 1080, such as duplicate geometry detection, IBM 3270 emulation with windows, 16.8 million-color palette and advanced communications options. It also features up to 4M bytes of display list memory and the 5080 Model 2's enhancements, like a programmable hardware cursor.

The basic DS 1082GX costs $16,500 with a graphics controller, 19-in. color monitor and keyboard. Deliveries are scheduled for June.

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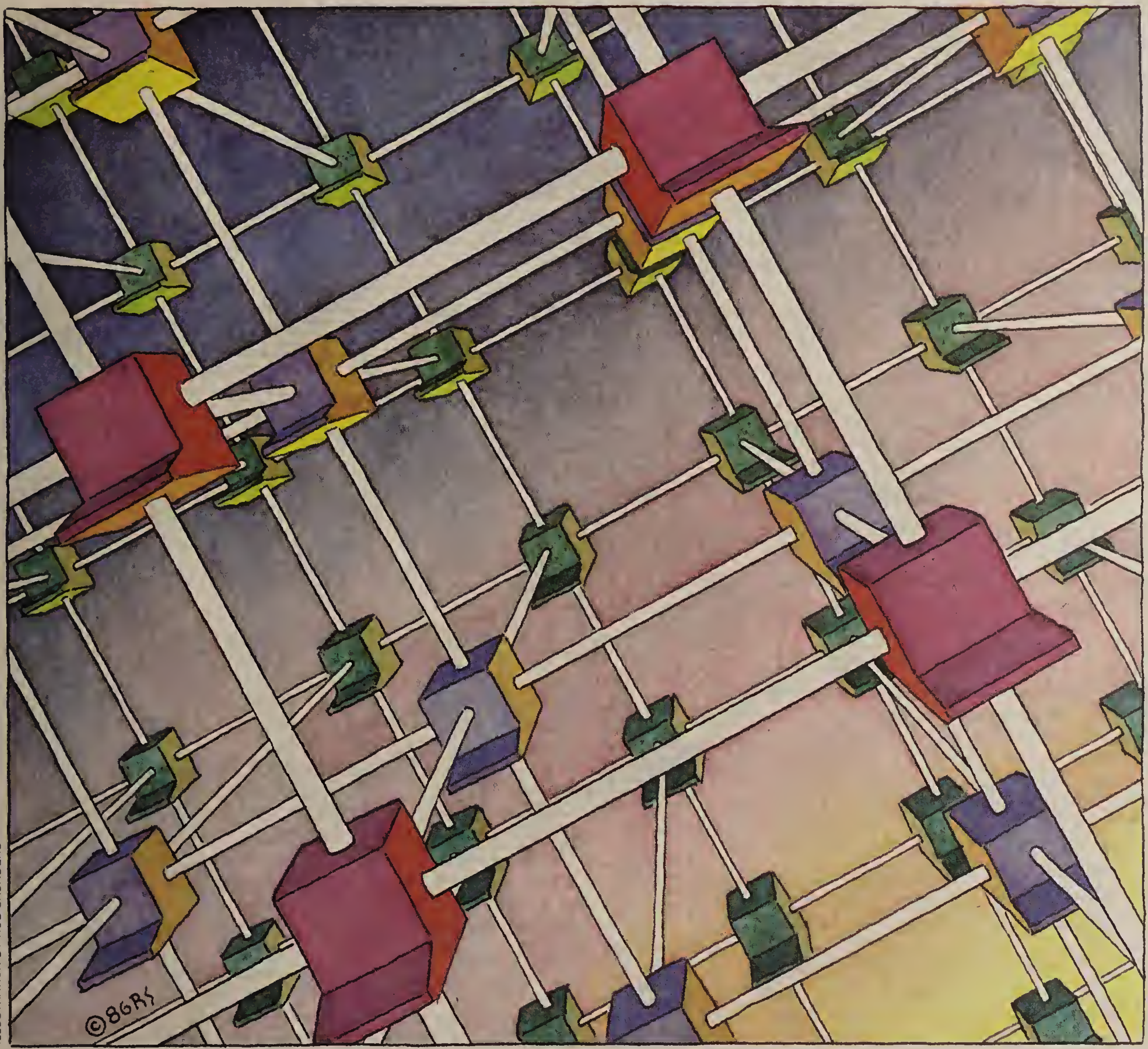

ILLUSTRATION BY ROB SAUNDERS

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Sharing applications and data files tops users' wish lists/70

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Microcomputer networking

Learn from successful users

By JOANNE KELLEHER

Until now, any involvement with microcomputer networks assumed a certain degree of pioneer spirit, given the relative newness of the technology. Organizations that ventured into microcomputer networking as recently as a year ago needed to pass through several stages of trial and experimentation before they settled on their networks.

Entry requirements are becoming somewhat less rigorous, however. Today's prospective users can avoid some struggle by building on the knowledge of those who came before.

Micro networks have proliferated rapidly during the past couple years, increasing from 15,000 installations in 1983 to 33,000 in 1984 and 60,000 in 1985, according to International Data Corp. (IDC) of Framingham, Mass. *Computerworld* asked managers at successful user firms to suggest tips for would-be users and found some common currents. Early users agree, for example, that the benchmark standards they set and the experiences they accumulated should serve as the base for future users' endeavors.

"There is a lot of documentation available now from consultants and users groups that can help you to pinpoint the pitfalls and advantages of certain products," says Jeffrey Farris, office automation manager at Southland Corp. in Dallas. "When we started, there was absolutely nothing."

Southland, the parent company of 7-Eleven Food Stores, began linking microcomputers in May 1984. Since that time, Southland has linked approximately 180 of the 600 IBM and compatible personal computers in its U.S. operations into 13 local-area networks.

The networks run Novell, Inc.'s Netware system software on a star-type topology and use Novell's Netware S-Net proprietary file servers. In addition to the 13 networks now in place, Southland has 10 Novell nets on order.

> ***Veterans' experiences indicate only one absolute: Any firm that wants to succeed with PC networks must hold a firm grasp on how the networks contribute to overall information goals.***

The firm is only now beginning to realize a portion of its original long-range goal: to tie individual networks together so that one administrator can troubleshoot network operations from a central spot and upgrade system capabilities with a single effort. Recently, Southland reached a milestone in that effort by linking two networks to support a total of 44 PCs.

All of Southland's networking decisions focused on this eventual direction. "Our choices of

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Kelleher is a Boston-based free-lance writer who specializes in high technology.

Learn from successful users

Continued from previous page

workstations, software and network were all predicated on much larger plans,'' Farris says. ''When we did our first network, we already had a vision of tens of departments using networks and were anticipating the day when those networks would be networked together.''

Farris' technical staff does not drive relentlessly for the fulfillment of this vision, preferring to let users' expanding needs set the pace for growth. The recent link between the two networks, for example, came only after one user department specifically asked for the expansion.

Patience accompanies many of Southland's networking decisions. The firm did not decide to forge ahead with the Novell configuration until it performed in-house tests on the vendor's products and competing systems.

Farris says the benchmarks seemed absolutely necessary at the time, with personal computer networking in its infancy, and they still make sense today. Any prospective user should run some in-house tests, he says. ''I think it's a good idea to get some hands-on experience before you buy.''

FIVE STEPS FOR SMOOTH NETWORK IMPLEMENTATIONS

MITCHELL J. HAYES

ONE **Locate early-user documentation and benchmark standards.** The learning experiences of consultants and early network users can help organizations that are currently planning a network purchase to pinpoint the pitfalls and advantages of various products.

TWO **Cultivate a direct relationship with the network vendor.** Once a net is purchased, managers can benefit by developing a direct relationship with a network vendor firm. As an alternative, managers should maintain close contacts with a reputable area network dealer.

THREE **Form a bi-level hierarchy to manage networks.** A centrally located manager with technical expertise is a necessity for a well-run network, as are local nontechnical network managers who can answer user questions and assume local network responsibility.

FOUR **Incorporate network growth estimates into prepurchase guidelines.** Organizations should consider physical layout options and growth potential questions before a network is purchased, as some topologies can impose limits on expansion.

FIVE **Sign a local maintenance contract.** One way managers can avoid net downtime is to sign a maintenance agreement with an area vendor representative or a reputable local service provider.

CW Chart

This advice does not rest unchallenged. Current users stand somewhat divided in their opinions on the necessity for site testing.

Nicholas Rossi, a systems analyst at U.S. Steel Corp. in Pittsburgh, spent months experimenting with different hardware and software combinations before he decided on a configuration for the firm's Mon Valley Works, a centralized management group for U.S. Steel's Pittsburgh-area plants. But he says that now, in most instances, companies can purchase a network based on specifications alone.

''I don't know that it is really necessary for everybody to reinvent the wheel,'' Rossi says. ''It might make sense for us, having gone through the process once, to bring in another network and run tests for comparison. But for someone else, starting from ground zero, it probably wouldn't be that useful.''

At the Mon Valley Works, a Standard Microsystems Corp. logical, linear token-ring network links the IBM Personal Computers of 35 managers who oversee logistics, energy usage, accounting and other functions for U.S. Steel's Pittsburgh operations.

The managers' network, in operation for seven months, runs Novell's Advanced Netware 286 1.02 systems software and uses an IBM Personal Computer AT as a server.

Before it decided on this configuration, U.S. Steel ran in-house benchmarks, testing the Standard Microsystems equipment and Novell software with a variety of different servers. This step seems unnecessary now, Rossi says, because benchmark results are widely available to prospective network users.

At this point, Rossi suggests, a network manager can probably gain sufficient knowledge by matching different network topologies' abilities against his firm's needs. The manager must first determine exactly what types of operations he wants to perform and how many users he plans on accommodating.

''If you know exactly what you want to do, it is pretty easy to see where the problems are likely to be when you talk to various vendors and look at their benchmarks,'' he says. Certain topologies, for example, allow for easier expansion than others.

To John Good, manager of distributed systems at Turner Construction Co. in New York, however, on-site testing seems crucial. ''I would strongly recommend that anyone who is looking for a network arrange to set up whatever he is considering in a test environment,'' Good says. ''I don't care how many user sites you visit or how many salesmen you talk to; nothing will replace seeing what the thing will do in your own environment.''

Turner, a construction management firm with 50 independent offices and 200 active job sites around the world, decided to adopt a networking standard — the Banyan Systems, Inc. Virtual Networking System and Banyan Network Server — only after several months and several phases of on-site testing.

The initial stage simply involved evaluating the complexity of system setup, a factor that weighed heavily, according to Good. ''We felt that whatever network device was installed had to be flexible enough that it could be administered by a nontechnical person, since it would be going into various territories and offices,'' he says.

In succeeding stages, the company put the Banyan network through its paces, testing software compatibility, microcomputer compatibility and communications capability.

To test software compatibility, Good's staff ran on the network every package the company used routinely — both commercial products and internally developed programs.

To test microcomputer compatibility, staff members hooked up various types of micros — IBM and Compaq Computer Corp. personal computers, which Turner currently uses throughout its operations, as well as some clone machines the company anticipated it might install later.

To test communications capabilities, Good and his staff subjected the network to several checks. They tested file transfer with a remote personal computer that dialed in to the network's server. They tested server-to-server communications by dialing out to a variety of distributors and to Banyan's headquarters. Finally, they tested the Banyan network in communications with a Rolm Corp. private branch exchange — Turner's telecommunications switch — and with an IBM Series/1, a machine that all of Turner's major territorial offices use to host financial applications.

With the tests completed, Turner is now in the process of installing three Banyan networks in its New York headquarters. The firm will use the networks primarily for local office automation applications, but one net will collect construction data dialed in from remote job sites.

Prospective network users should note that all of Turner Construction's test activities took place within a protected environment, the distributed systems

Continued on page 66

Expert's Opinion

Networking consultant Bryce

Standards ease net management

By JAMES Y. BRYCE

Executives who have tried to decipher microcomputer network standards over the past several years have suffered their fair share of confusion.

In 1983, when the Institute of Electrical and Electronics Engineers, Inc. (IEEE) attempted to define microcomputer network standards, user and vendor discussions centered around physical and data link methods for media access: baseband vs. broadband or contention (carrier-sense multiple access with collision detection) vs. deterministic (token passing).

Little discussion arose concerning higher level questions such as the use of disk vs. file servers or the document exchange formats, and even less consideration was given to standards for the entire industry.

Datapoint Corp.'s Arcnet furnished one standard, and Xerox Corp.'s Ethernet, underwritten by Digital Equipment Corp. and Intel Corp., furnished a second standard.

The IEEE, faced with conflicting vendor products and user needs, conceded the impossibility of agreeing on one physical layer specification and opted for three:

- The 802.3 standard, essentially Ethernet.
- The 802.4 standard, the broadband token bus.
- The 802.5 standard, the token ring.

Observers of the standards scene might have concluded at this point that the vendors would rally around the IEEE's guidelines, but shortly thereafter, IBM added to the standards confusion by producing the Cluster, which was not based on any of the above standards.

Then, in mid-1984, a world ready for the anticipated IBM token ring was greeted instead with the IBM cabling system which, IBM said, would be the basis of all its network connections from then on.

IBM continued the confusion by

Continued on page 65

Bryce is president of Netserv, Inc. in Austin, Texas, a consulting, training and service firm specializing in local-area networking.

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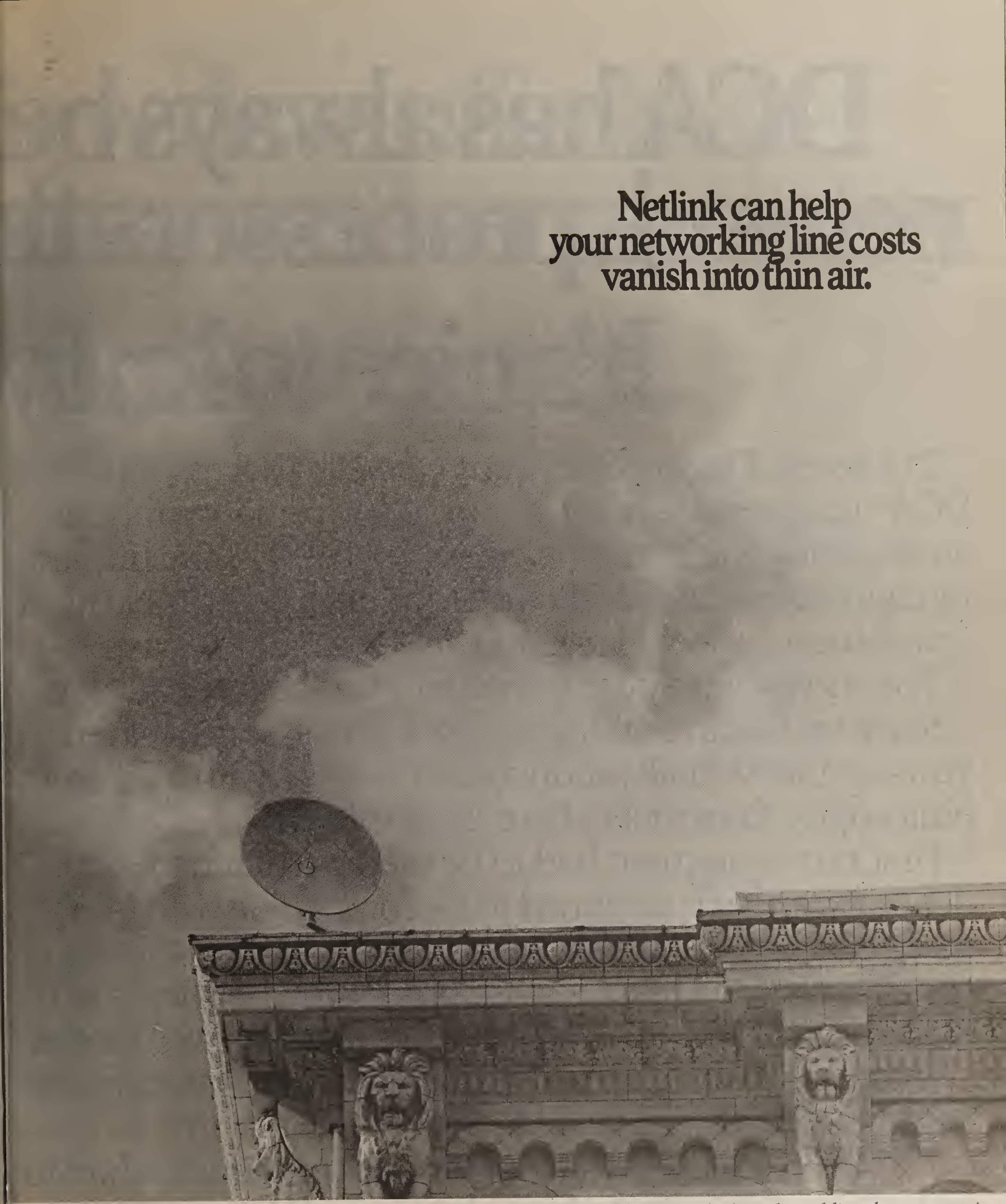

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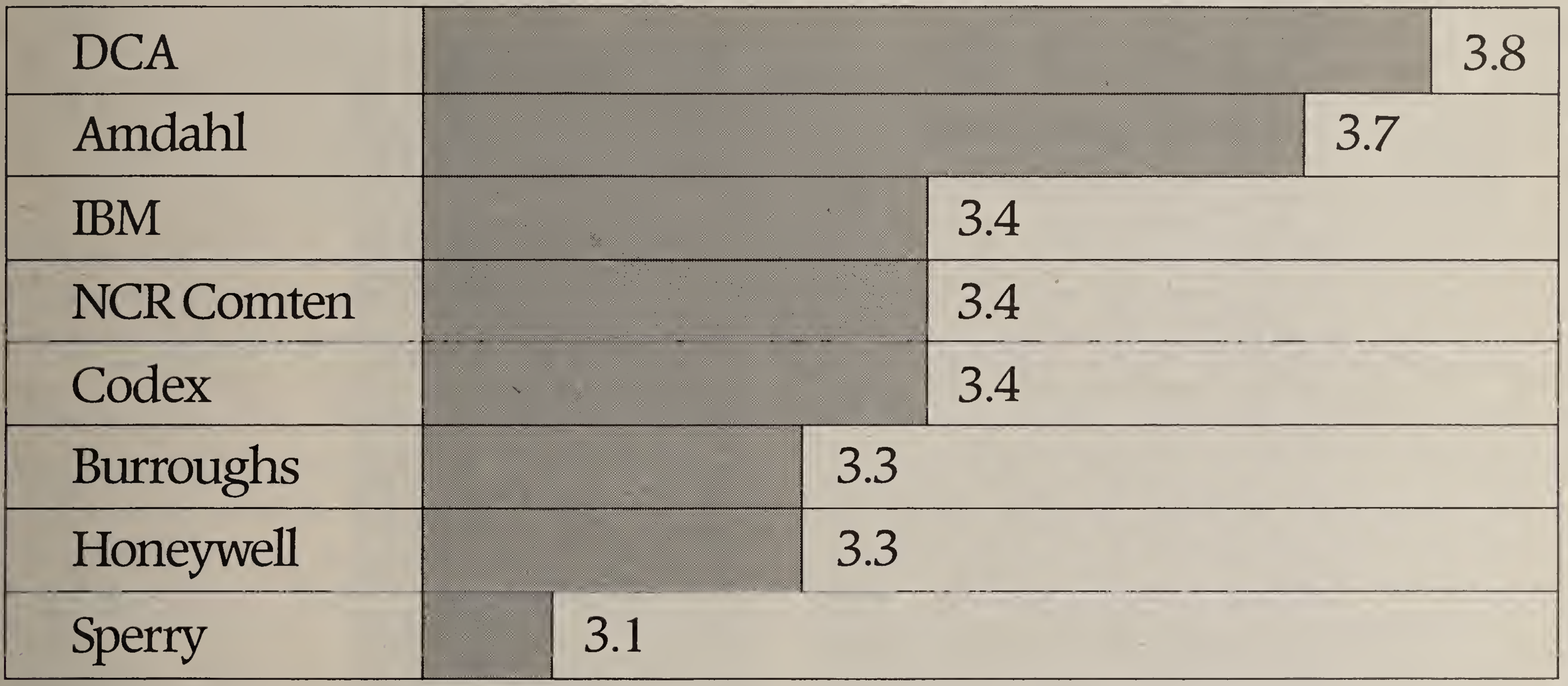

1985 DATAPRO NETWORK USERS SURVEY

Source: Datapro Research Corporation, Communications Processors Survey, 12/85.

This graph shows the eight communications processor manfacturers who received over 15 responses and how they were rated in overall performance by the users. The users also rated DCA as the best among these eight manufacturers in several individual catagories: ease of installation, ease of operation, ease of expansion, quality of software/firmware, ease of programming and quality of service/technical support.

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Continued from page 60

introducing the PC Network, which is based on Sytek, Inc. broadband technology. This product fit neither the IBM cabling system nor any of the IEEE standards. IBM's latest move was last October's announcement of the token-passing ring product for microcomputers, a product fully in accord with the IEEE 802.5 standard.

So where does this leave the executive who must make recommendations and decisions concerning his company's network future? A lot better off than last year — that's where.

Now managers can stop worrying about which type of physical network to buy and can stick with one of the three established by the IEEE. Which one? Well, the answer depends on with which vendors the manager's firm has connections.

For example, Boeing Co. and the National Bureau of Standards selected 802.3 as the basis of office automation, and DEC and Xerox based their entire systems on Ethernet, which was merged into 802.3.

For organizations involved in manufacturing, General Motors Corp. established the Manufacturing Automation Protocol based on the 802.4.

So what of the token-passing ring — the 802.5? IBM writes so many documents with statements of direction supporting the token ring that major IBM installations must seriously consider adopting it.

Managers should note, however, that although IBM claims that the token-passing ring will run on existing unshielded, twisted-pair wire, any significant upgrade in the data rate will fail on low-grade cable systems.

Excessive concern over selecting a protocol may be unnecessary as gateway technology is developing so rapidly that a diversity of physical networks may be operated efficiently as a collection of subnets tied by means of gateways.

Most network manufacturers are providing gateways between their original network of choice and the token ring. One product, Novell Inc.'s Netware, allows applications houses to produce packages that work on a number of different physical networks.

In addition, Microsoft's DOS 3.1 and Netbios, first announced with the IBM PC Network in 1984, provide all manufacturers with the basis for a standard. These products allow vendors and users more latitude in their network options. For example, 3Com Corp. now offers its 3Plus software for both Ethernet and IBM token-ring networks.

This means that applications programmers need write only to the IBM/Microsoft network standard. They do not have to worry about the Novell or 3Com or Nestar Systems, Inc. product variations.

Still lacking are final versions of message and document interchange. However, the next several months are expected to see more and more products based on IBM's Distributed Office Suppport System (Disoss) and X.400.

Again, IBM's weight in the information industry has resulted in a clear standard. This does not mean IBM hardware and software need be used in networking; they simply furnish the design basis for a common standard.

Finally, managers can breath easily: Gateways will provide connection among all widely used networks; DOS 3.1 and Netbios will provide interchangeable network operating systems and applications programs; and Disoss and X.400 will provide document interchange. Things in the world of networks are clearing up. ■

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Continued from page 60

division's lab and offices. Conducting trials in a user environment is not advisable, as Southland's Farris learned from experience.

About a year before Southland discovered the Novell system that it eventually adopted, the firm installed Corvus Systems, Inc. Omninets in three departments.

Although the in-use testing certainly helped to refine the corporation's network requirements, the experience proved costly in terms of staff time and productivity, Farris says.

He confined later tests of other vendors' network products, allowing them to proceed only within his office automation group's offices. "I feel like it's fine if we, as a service to the rest of the corporation, waste some of our own time," Farris says, "but it's not a good idea to involve general staff."

Whether or not a company opts for some level of pretesting, users say, a good vendor relationship is critical.

A few years ago, when demand for microcomputer networks was low, users — especially those at large corporations — could go directly to manufacturers for assistance. Southland's Farris first discovered that option after his firm failed to work through some technical problems with a local dealer.

"When a Novell representative stopped in to pay a courtesy call, we brought up some of the problems we were having," he says, "and the company quickly stepped in and helped us to resolve them."

After that experience, Southland deliberately set out to solidify a direct relationship. Employees cultivated contacts with Novell technical staff members at trade shows, and Southland promoted Novell's efforts to establish a users group. "We've been trying as much as we can to stay involved with Novell on a corporation-to-corporation basis," Farris says.

Although that strategy worked for Southland because of its size and the timing of its efforts, Farris doubts that many user firms could forge such a direct link to a supplier today. "The first thing I'd advise people to do today," he says, "would be to scout very heartily for the most

Continued on page 68

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Success hinges

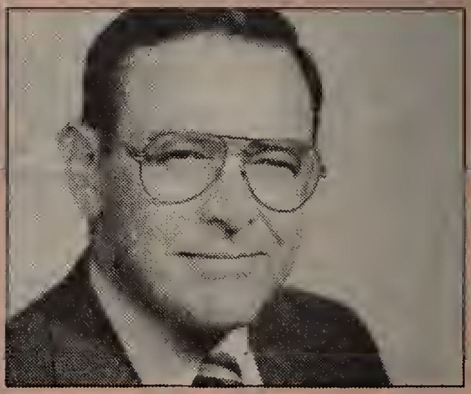
Anyone who wants to know why some microcomputer networks succeed while others turn into tangles of frustration should look for the answer in records of the planning process, consultants say.

"Seventy-five percent of what determines eventual success is the extent of understanding that exists at the start about what the company really wants a network to do," says Ronald Berkeley, a partner in the management services division of Richard A. Eisner & Co., a certified public accounting firm in New York.

This advice may sound elementary, but companies ignore it all the time, according to Berkeley and other consultants. Many businesses, in their anxiety to find some way of organizing a multiplying population of micros, rush toward networking as a solution without stopping to factor in their goals.

Networks are not the best means to all ends. In many cases, companies that think they need networked personal computers would actually benefit more from a multiuser system, according to Raymond DiCasparro, vice-president of marketing at Brown & Associates, a consulting firm and value-added network reseller in Belmont, Mass. Usually, for example, multiuser systems provide better concurrent access to data than do PC nets.

Generally speaking, a company acts unwisely if it makes any move before it holds a detailed job description in hand. "Absolutely the worst thing that you can do is to try to look at network options and define your needs at the same time," says Lawrence Bolick, supervisory consultant in the manage-



> *'Seventy-five percent of what determines success is the extent of understanding that exists at the start about what the firm wants a network to do.'*
>
> — Ronald Berkeley
> Richard A. Eisner & Co.

Survey

on up-front plans, advisors say

ment consulting services division of Coopers & Lybrand in New York.

Of course, defining needs involves a great deal more than simply verifying that a microcomputer network can satisfy a company's immediate requirements. Companies large enough to support the eventual appearance of numerous departmental networks, for example, must formulate their requirements in the context of future needs for interconnection.

"No network is an island," says Marty Gruhn, vice-president of the Sierra Group, an industry research and consulting firm in Tempe, Ariz. "Unless you have a top-down strategy for how networks are going to be coordinated, you'll wind up with nothing more than a lot of wires."

Although companies that build from the bottom up sometimes stumble accidentally on success, luck cannot substitute for technical knowledge, according to Gary Audin, president of Delphi, Inc., a telecommunications consulting and education provider in Pompton Lakes, N.J. Audin says firms that plan to install a network need to grasp the different levels of compatibility that networking involves.

He points out that even two Ethernet networks will not necessarily be physically compatible, because they may run at different speeds. Beyond basic physical compatibility, possible problems lurk at the file structuring and file transfer levels. Trouble even arises with the generic Xmodem protocol, thanks to the variety of error-detection schemes associated with it.

Coopers & Lybrand's Bolick says a firm that buys a PC network should also think about possible requirements for automatic gateways to the corporate mainframe. At the very least, an organization should determine whether its prospective network vendor plans to make any provisions for interfaces to the International Standards Organization's Open Systems Interconnect, IBM's Systems Network Architecture and similar specifications.

Even in a company that plans to install a single personal computer network with no links to a host or to other PC nets, managers must look beyond surface requirements and consider hidden agendas and individual job requirements.

"I wish I could tell you the number of times this has happened," says Thomas Cross of Cross Information Co., a consulting and market research firm in Boulder, Colo. "I ask clients, 'What do you expect you'll be using a network for in six months time?' and hear them say, 'Well, probably just for word processing on a few letters and memos.' Then, when I come back six months later, they have totally eclipsed that original purpose with a multitude of other uses."

Often, users' expanded awareness of what micros can do warrants the extension of network functions. Occasionally, though, managers need to rein in enthusiasm and make sure users choose the right tool for each job, says Pete Moulton, a partner in Moulton-Minasi & Co., an education and consulting firm in Columbia, Md.

Just because a company installs a PC network, Moulton says, users do not need to perform every task through that network. "For certain applications, people will want every ounce of speed and horsepower they can get," he says. "In those cases, networked operation is not the answer."

— **JOANNE KELLEHER**

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— Lawrence Bolick
Coopers & Lybrand

'No network is an island. Unless you have a top-down strategy for coordinating networks, you'll wind up with nothing more than a lot of wires.'

— Marty Gruhn
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Continued from page 66

knowledgeable and reputable dealer in the area."

Rossi at U.S. Steel agrees. "No matter how large an organization you are, you need a local contact," he says. "And, for the most part, companies undertaking networking are going to live or die based on how good a computer store they can find."

Visic, Inc., a semiconductor research and development company in San Jose, Calif., attributes much of its local networking success to technical support from the local Businessland store that supplied the company with its 3Com Corp. networking equipment, according to Merrie Hewitt, Visic's accounting manager for MIS. Visic uses 3Com's Etherlink network software and boards and relies on the vendor's 3Server file server as well.

"My personal representative from Businessland had a tremendous amount of technical knowledge and was able to work wonders," Hewitt says. "Basically, I just told him, 'This is what I want, and I want it to work, and I want it now.' "

The applications she expected the network to support included electronic mail, word processing, spreadsheets and project management, as well as order entry and accounts receivable.

Network operations did not begin immediately but in three months, the amount of time it took "to get what I felt comfortable with as a well-running network," Hewitt says. In large part, the interval arose out of the necessity to wait for an upgrade to 3Com's Etherlink software.

Visic needed the upgraded software to eliminate operating bugs associated with use of the 3Server. Hewitt says she feels quite sure that without the Businessland technician's expertise in isolating those bugs and making related adjustments to other software, Visic's network would still not work today.

With the technician's help, the network has been up and running for a little more than a year. It connects 21 IBM and Compaq PCs and supports all the applications Hewitt originally desired.

Hewitt says she stopped by many computer stores during her network shopping process, and the visits did not inspire her with much confidence in the general quality of retail support. "I'm not the most technical person in the world," she says. "But even I could tell from just walking into those stores that I wasn't going to get either the right answers or the technical support I needed."

Routine administration of any configuration that ties more than one network usually requires managers with two separate levels of responsibility.

- Someone centrally situated, either the person who supervised the selection of the system or a technician appointed by that person, oversees technical matters. The central administrator's tasks include maintaining serial numbers, user ID numbers and passwords; installing new equipment; allocating disk space; and checking of local backup.
- Someone within each individual network area, typically an end user with little or no technical training, assumes local responsibility. He answers other users' simple questions and serves as ombudsman for the group.

Foley & Lardner, a Minneapolis-based law firm, exemplifies this dual approach to network management. The firm runs 19 Corvus Omninet networks, 10 in its home office, two in each of four remote offices and one at a fifth remote site. All told, the networks comprise 157 Corvus Concept microcomputers — 111 in the home office and between three and 19 at each remote office.

Users rely on the networks primarily for word processing and centralized printing, but they can also access data stored in a Tandem Computers, Inc. TXP mainframe via IBM 3270 emulation and a custom software and hardware link.

Centrally, administrative responsibility for network operations resides with one technical person. In each branch office, an end user oversees day-to-day network operation.

"We've been very fortunate," says Ralph Weidler, director of computer services

Continued on page 70

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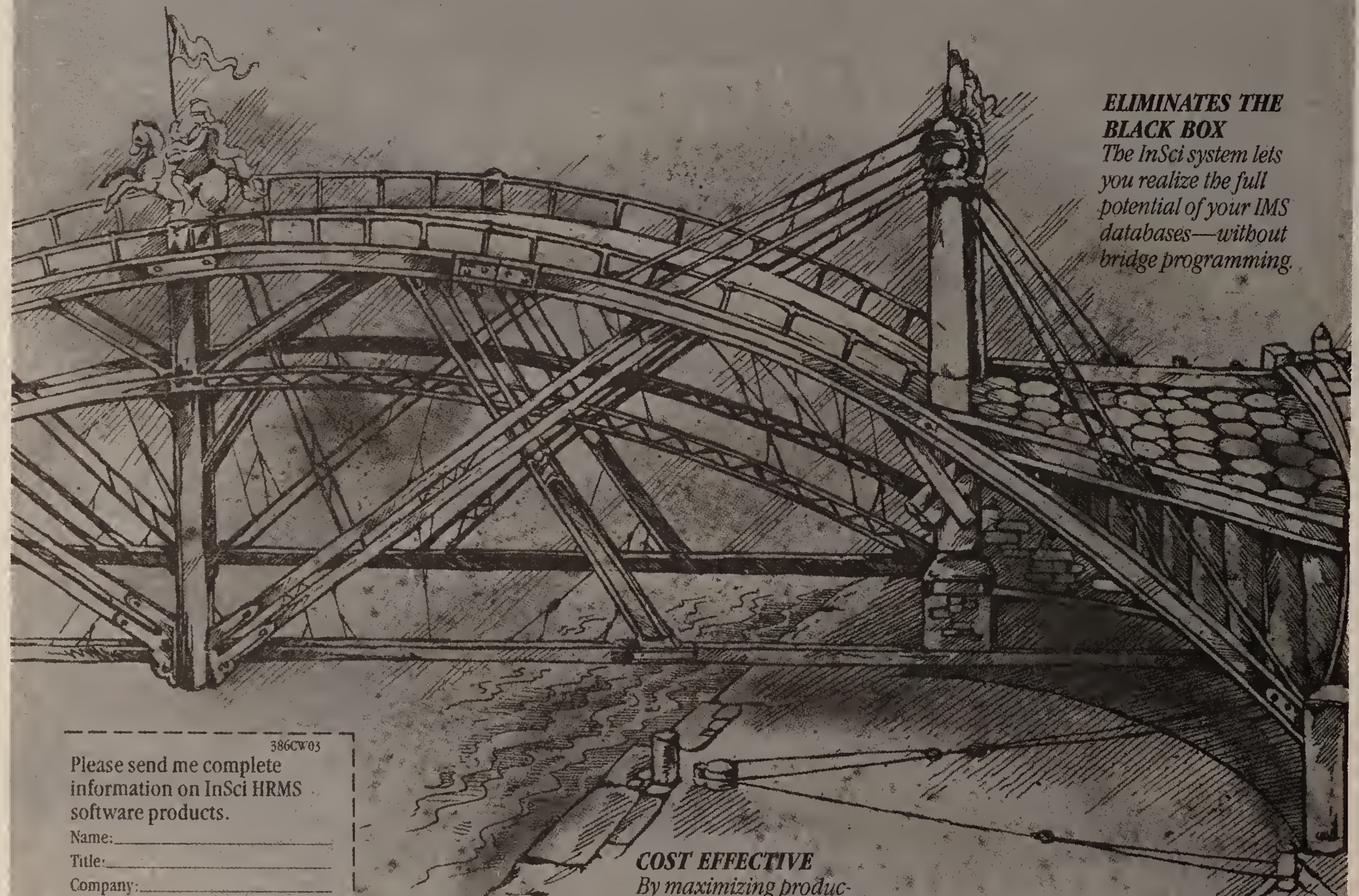

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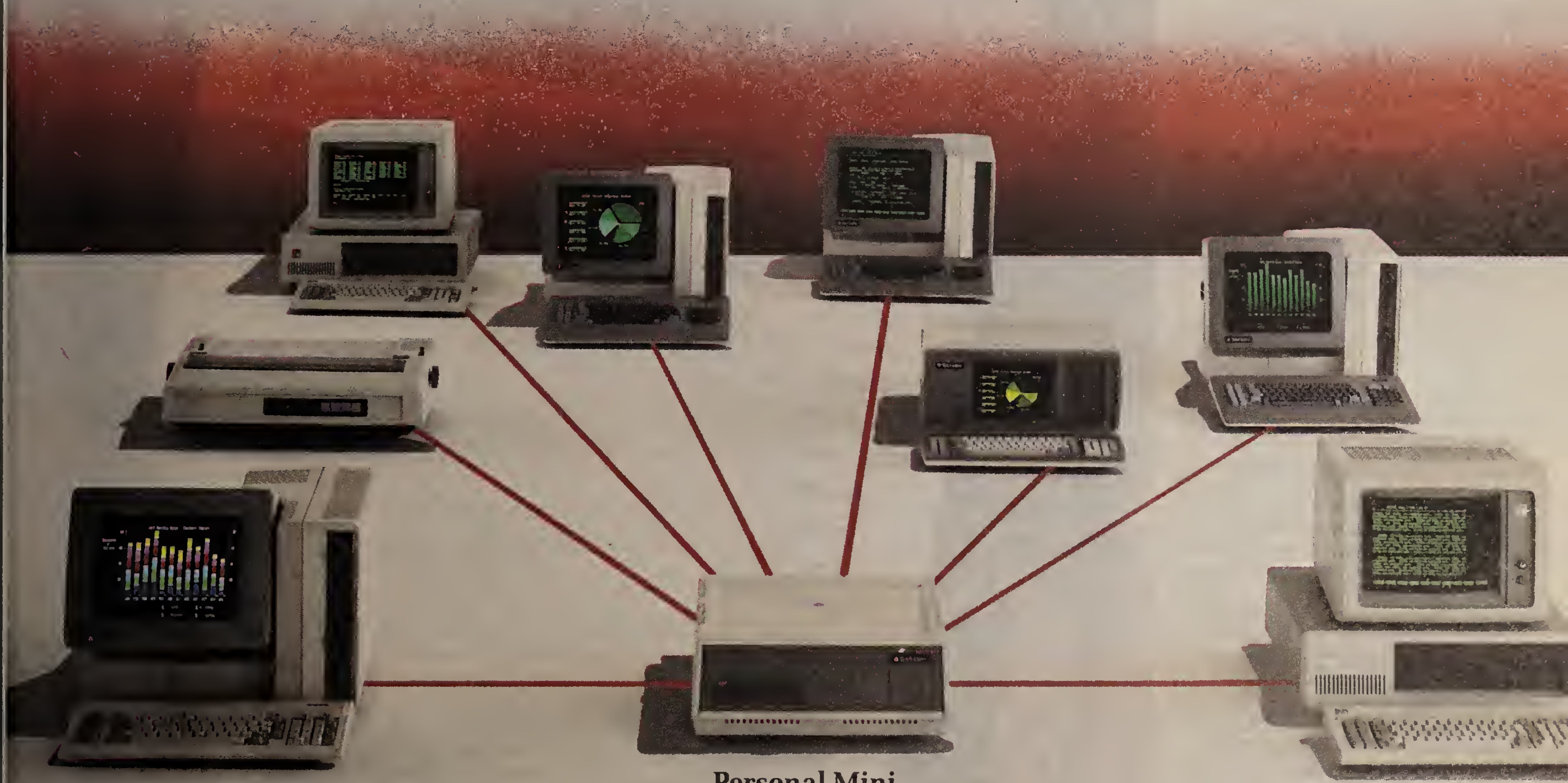

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Continued from page 68

at Foley & Lardner. "In our remote offices, we've always managed to find a person who happened to have an aptitude for computers and whom we could train to perform the small number of tasks that are required."

Foley & Lardner's approach to local network administration developed essentially as an outgrowth of a tactic the firm used when it began installing its Corvus networks.

Because the firm had operated a centralized word processing environment, employees felt unfamiliar with microcomputers. Managers assumed the employees feared the machines as well.

In order to smooth the transition from the word processing machines to the PCs, Weidler and his staff selected four people "who seemed like they might be technically adept and interested in this kind of project." The firm dubbed these recruits "pathfinders" and asked them to work and learn along with Weidler's technical staff in an effort to spread information and dispense calm.

Most companies that install microcomputer networks never face quite this large of a cultural adjustment problem because they build on an existing base of PCs and PC users.

U.S. Steel's Rossi suggests, however, that any company makes a serious mistake if it fails to invest in some additional training for experienced micro users when those users join into a network.

Users typically need no special network training but must understand more about personal computer operations in general, he says.

"Most people who work on PCs tend to be married to one particular piece of software and really know very little about how the PC works or what it will do. They really should know a little more than that if they are going to use a network effectively. Not a lot more, really, but certainly at least how directories work," he says.

> **"**
>
> ***'For the most part, companies undertaking networking are going to live or die based on how good a computer store they can find.'***
>
> — Nicholas Rossi
> U.S. Steel Corp.

Network planners, for their part, must educate themselves about their organizations' physical layout and growth potential. If they skimp on planning, they may wind up either presiding over isolated anachronisms or needing to rip out expensive wiring and start over again as new requirements surface or the realistic limitations of topologies become apparent.

First of all, an organization's network managers need to survey the territory a micro network will cover because some topologies are better suited to distance than others are.

Continued on page 72

Net users like file sharing but want more speed

By LOUISE HERNDON WELLS

What users like most, by far, about their microcomputer networks is the ability to share applications and data files. What they complain most frequently about is poor performance. Many would change their approach somewhat if they could start over again, but almost none would stay away from networking altogether.

Wells is a local networking analyst for Dataquest, Inc., a market research firm in San Jose, Calif.

These findings come from a survey of microcomputer network users completed last month by Dataquest, Inc., a San Jose, Calif., market research firm. Dataquest canvassed approximately 150 users in companies of various sizes in a variety of industries. All users surveyed use 3Com Corp.'s Etherseries, Corvus Systems, Inc.'s Onminet, IBM's PC Network or Orchid Technology Co.'s PCnet — the four most popular local-area networks on the market today.

The survey uncovered some key trends:

- Most microcomputer networks are small, connecting between three and seven devices.
- The most common microcomputer network applications are data base management, spreadsheets and word processing.
- A desire for shared storage drives most micro net purchases.
- Users choose one vendor's network over another mainly because of price, followed closely by operating features.
- One quarter of all networked microcomputers share a laser printer.
- Nearly half of all microcomputer networks communicate with some resource outside the network, such as an on-site mainframe or a remote data base.

Overall, the Dataquest survey

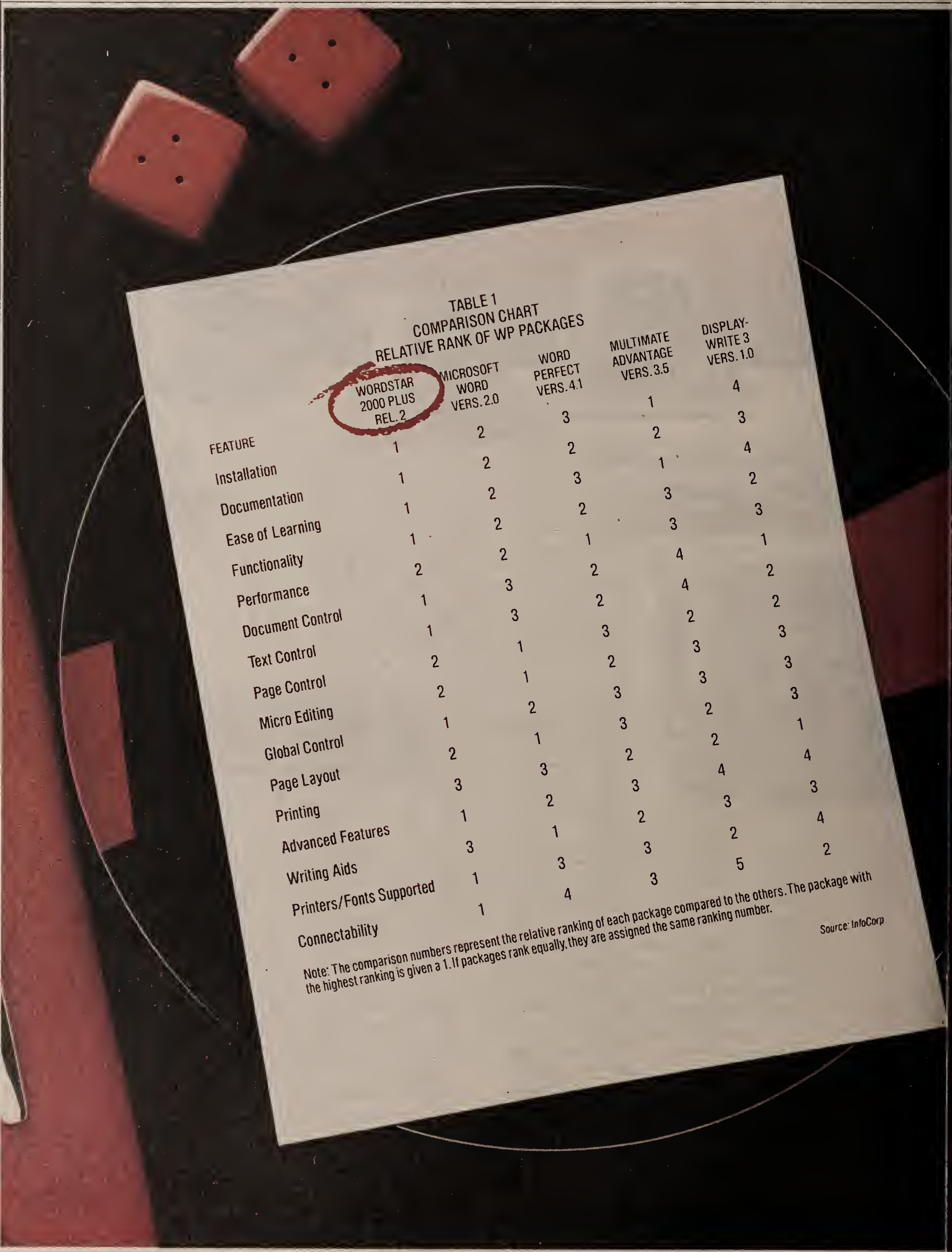


TABLE 1
COMPARISON CHART
RELATIVE RANK OF WP PACKAGES

FEATURE	WORDSTAR 2000 PLUS REL. 2	MICROSOFT WORD VERS. 2.0	WORD PERFECT VERS. 4.1	MULTIMATE ADVANTAGE VERS. 3.5	DISPLAY-WRITE 3 VERS. 1.0
Installation	1	2	3	1	4
Documentation	1	2	2	2	3
Ease of Learning	1	2	3	1	4
Functionality	1	2	2	3	2
Performance	2	2	1	3	3
Document Control	1	3	2	4	1
Text Control	1	3	2	4	2
Page Control	2	1	3	2	2
Micro Editing	2	1	2	3	3
Global Control	1	2	3	3	3
Page Layout	2	1	3	2	3
Printing	3	3	2	2	1
Advanced Features	1	2	3	4	4
Writing Aids	3	1	2	3	3
Printers/Fonts Supported	1	3	3	2	4
Connectability	1	4	3	5	2

Note: The comparison numbers represent the relative ranking of each package compared to the others. The package with the highest ranking is given a 1. If packages rank equally, they are assigned the same ranking number.

Source: InfoCorp

focused attention on four topics of interest to actual and potential network users: selection criteria, network configuration, user satisfaction and expansion plans.

Selection criteria. According to the survey's results, users' main reason for buying microcomputer networks is to obtain shared storage for either applications software or data files. Users rate the desire for electronic mail and shared printers among the least significant reasons for making a network purchase.

Almost 60% of users list price as a criterion for choosing one vendor's microcomputer network over another's; 52% say operating features influence their choice. Vendor reputation and dealer support also come into play for 38% of network buyers.

Network configuration. Most operational personal computer networks are very small, and few support more than 20 devices. Almost all use a microcomputer as a network server. About half of all networks use dedicated micro servers.

Only one-fourth of personal computer networks tie together all of a company's on-site micros, and these networks reside in small companies. In larger firms, networks connect only a minority of all on-site microcomputers, usually because personal computers are scattered throughout nonallied operating departments.

Although shared storage is the driving force behind most purchases, more than half of microcomputer networks share only one hard disk. More than three-fourths share either one or two. Among the users surveyed by Dataquest, the most popular shared disk size is 20M bytes followed by 10M bytes.

Of the many printers typically attached to microcomputers on local-area networks, only a few can operate as shared network resources. Most networks support three or fewer shared printers. The majority of networks use dot matrix printers, and several share fully formed character printers. Dataquest's discovery that one-fourth of all local-area networks share a laser printer is interesting because laser printers remain relatively uncommon elsewhere.

Communications with some resource outside the network is very common. About 40% of the networks featured in the Dataquest survey connect to an on-site multiuser host computer; 20% access a remote multiuser computer or data base; 10% connect to another on-site personal computer network.

The data base management, spreadsheet and word processing software packages that users install on their networks tend to be single-user packages rather than products designed specifically for use on local-area networks.

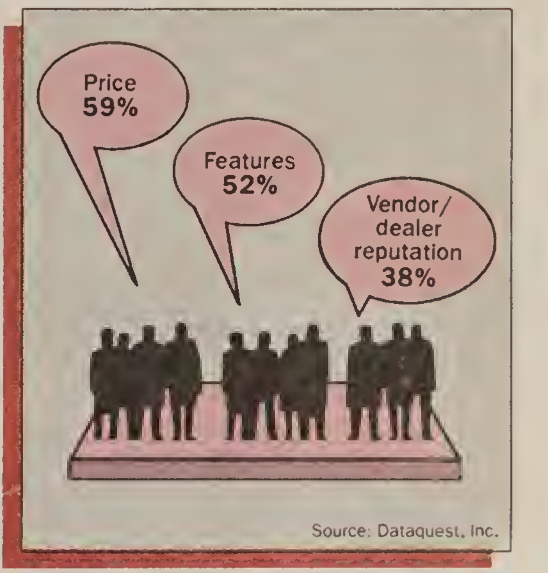
User satisfaction. Three quarters of the users surveyed feel that their organization's network satisfies most of their expectations, and only a tiny minority reports total dissatisfaction. Of the one quarter who admit to some dissatisfaction, one-third say they are unhappy with their operating software. Poor network performance rates as the second strongest complaint, with more than a quarter of all dissatisfied users listing speed as a problem.

Half of all the users Dataquest surveyed say they would change their approach to networking somewhat if they had a chance to start from scratch. Of this half, 54% would choose a different vendor's hardware, and 15% would choose different operating software.

Of all the users surveyed, only about 5% would change their minds totally and not buy a personal computer network.

MITCHELL J. HAYES

USERS' CRITERIA FOR CHOOSING A NETWORK



Source: Dataquest, Inc.

Users of four popular PC nets told Dataquest they used price and operating features as their primary criteria for choosing among vendors' offerings.

Users like their networks mainly for the reasons they bought them: the ability to share applications and data files. They are also fond of user-friendly features and printer sharing.

Expansion plans. Most of the microcomputer network users that Dataquest surveyed plan to expand their networks this year by adding new devices and services. Their chief motivations are additional shared storage and improved network speed and reliability.

About 62% of the users plan to add more microcomputers to their networks, and most intend to add shared printers and drives.

Many users also plan to expand the communications capabilities of their network. About one-sixth expect to add connection to an on-site multiuser computer, and another sixth plan to add access to a remote multiuser computer or data base. Nearly one quarter plan to connect one microcomputer network to another on-site micro network. ■

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Continued from page 70

Common bus and star topologies, for instance, can limit expansion because they require that all workstations connect to a trunk line or a central connector.

Geographical limitations were a major consideration when Alva Corp., a pharmaceutical products company in Palo Alto, Calif., decided on its network topology, according to Fred Knox, the firm's manager of programming and operations. Alva chose Nestar Systems, Inc.'s Plan, a logical token-ring network, over 3Com's Etherlink, an Ethernet-based net, partly because the Ethernet bus topology could not meet the firm's physical needs.

"The Ethernet-type, common-bus network, where you have to run a cable past every station, is fine if all your users are in one building," Knox says. "But we are physically spread out over eight buildings."

Alva installed its network two years ago. It now supports 82 users in a configuration of IBM Personal Computers, PC ATs and Nestar Plan 4000 file servers.

Logical token-ring topologies, like Datapoint Corp.'s Arcnet, allow for branching off of a network's central cable via active and passive hubs, according to U.S. Steel's Rossi. This sort of configuration, he says, offers the best hope for organizations that "aren't really sure what they may need or want in the future."

Knowing an organization's needs from the start is rarely easy, says Rossi, who has altered the network at the Mon Valley Works three times in seven months.

"Unless you have a very static organization," he says, "it is hard to decide unequivocally beforehand just how

Continued on page 74

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Assessing

By JOYCE McKEE

Before managers purchase expensive local-area networking equipment, they should take time to increase their awareness of network technology because trouble will occur if they remain naive about the technology's limits.

The following guidelines are designed to help an organization assess its needs and understand microcomputer networks' abilities before the firm makes a decision to buy. These guidelines should serve not to dampen anyone's enthusiasm but to prepare users and managers for the realities of network use.

☑ **Characterize the current business environment** according to type of business applications, amount and direction of information flow among users, number of users and number of micro devices (including peripherals).

Networking offers distinct advantages for applications that demand speed. With a properly implemented network, a user can tap more information sources in less time than he can with a stand-alone micro.

Local-area networks also facilitate the flow of information because they allow users to share information in a controlled and centralized manner — without the frustration or risk of duplicating diskettes.

Networks fulfill an additional business need: Because they promote the use of shared information, rely on disk servers and allow multiple users to queue to a single printer, networks greatly decrease an organization's need for microcomputer peripherals. Local-area nets also let multiple personal computer users access a common, outside data base via a single, shared modem.

☑ **Note the problems of the current micro environment** and the objectives that local-area network technology might accomplish.

Networks facilitate data access and the sharing of information and peripherals, but they cannot solve all of an organization's personal computer problems. Managers need to observe network technology's inherent limitations. A network is simply a transport mechanism and can serve as nothing more. It will not, for example, solve software applications problems.

McKee is a senior consultant with B. R. Blackmarr & Associates, Inc., a management consulting firm based in Dallas.

organization's network needs key to exploiting technology

☑ **Evaluate personnel resources** to ensure the organization retains people who can manage both the implementation and the daily operation of a micro network.

Proper network installation and operation require substantial technical expertise, which can range from installing a network card to organizing all the files on a disk server or writing utility programs.

Network planning and administration also require management skills, including the ability to define business applications and to develop a strategic plan for local-area networking as well as the ability to train end users.

Organizations should try to find an in-house network manager who displays a knack for these managerial tasks along with his technical skills.

☑ **Prepare for procedural changes** and changes in office work.

Software often functions differently on a micro network from the way it works on a single-user system. Before an organization commits itself to a network technology, it should carry out an in-depth investigation to find out how its single-user programs will run on the proposed micro network.

This step gives the organization's users a chance to decide whether the network's advantages outweigh the trouble of changing procedures. It also helps users understand and prepare for the changes that will come.

☑ **Forecast growth patterns** over the next three to five years and plan for additions to the network.

The number of users on a network can easily triple within two years. If an organization does not forecast such growth and plan for it accordingly, equipment acquisition will never keep pace with users' needs.

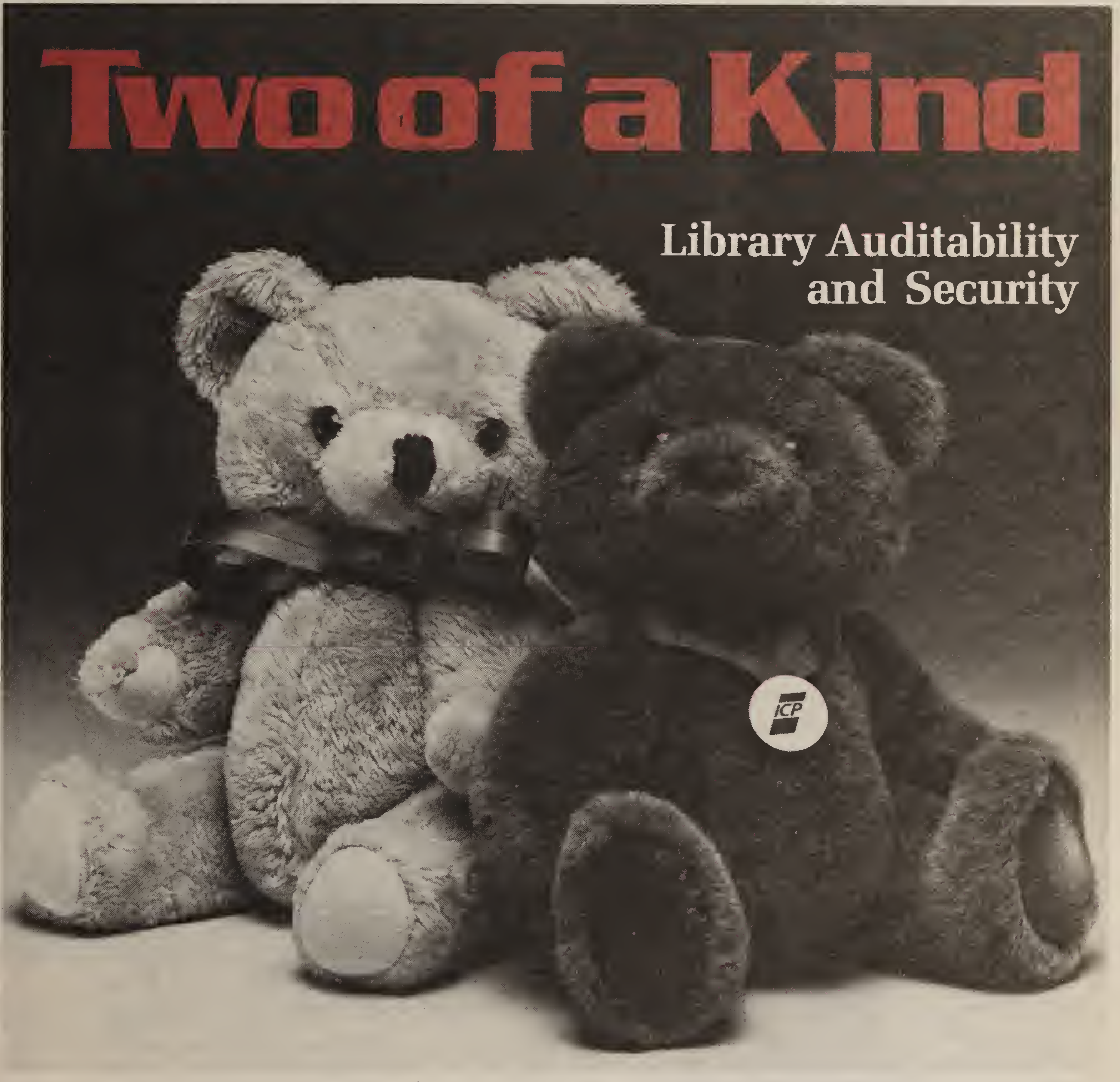
Beyond these guidelines, the acquisition of local-area networks is similar to any other purchasing decision. Managers should evaluate alternatives to network technology and analyze the price of each proposed component in order to justify the cost of the whole. ■

Net managers face challenge

Overseeing network operation requires extensive administrative and technical expertise. An organization should identify an in-house network manager who can accomplish the following tasks:

- Develop a focused strategic plan, a general configuration plan and a detailed installation plan for the network.
- Identify network applications.
- Determine interface and file-transfer specifications.
- Review the organization's facility to see that it can physically accommodate the network.
- Make sure the network complies with local building codes.
- Develop a wiring diagram.
- Draw up a network components list.
- Acquire hardware and software components.
- Negotiate an installation contract with network equipment vendors.
- Install hardware and software components.
- Organize all of the files on a disk server.
- Write utility programs.
- Train end users.
- Administer files.
- Oversee backup and recovery operations.
- Add new users to the network.
- Change passwords and carry out other maintenance operations.

— **By JOYCE McKEE**



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much growing you plan to do and how much a network will have to expand."

Maintenance requirements for PC networks vary, but experienced users are nearly unanimous in noting the need for good local service. They say any network user should enter into a maintenance agreement with a vendor's local representative or an independent service provider.

Most users suggest double-checking a service provider's local resources to make sure they are sufficient to meet the user's maintenance needs. If a provider's local service center consists of a lone technician who keeps just a few spare parts on hand, the user organization may want to look elsewhere.

Even organizations that never venture outside for personal computer support should seriously consider making an exception in the case of personal computer networks, according to current users.

Southland, for example, does not normally bother with maintenance contracts for micro equipment, but relies on outside service for its network. Reliability is far more critical for a network than it is for a standalone machine, Farris explains, "and we don't really have the technical staff on board that would be necessary to ensure that there won't be any major interruption of service."

For protection against network downtime, Southland depends on a strong maintenance contract. The firm's local maintenance provider, a third-party company that specializes in Novell networks, guarantees a two- to four-hour response time.

Even with this guarantee, Farris finds extra precaution advisable, so when he negotiated the firm's maintenance contract, he made sure to include a provision that a spare kit be kept on-site at Southland.

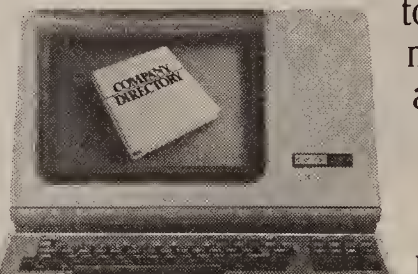
"Because the Novell proprietary server we are using has different parts than a normal microcomputer, we thought it would be a good idea to make sure we had a supply of those parts as well as hard disk drives on hand," he says. "That way, if the network goes down, we can be sure we won't have to wait for anything to be ordered."

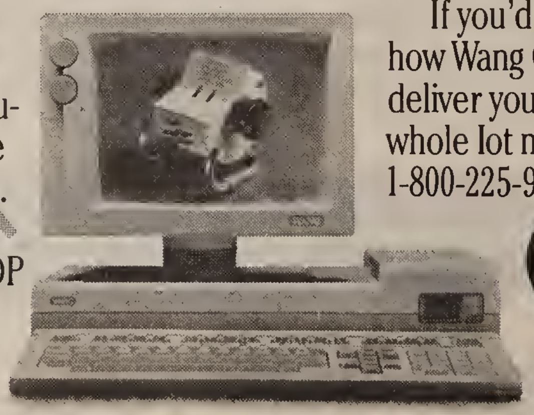
□ □

As the disparate experiences of veterans like Farris and Rossi attest, no single right path to networking success exists, and none seems likely to emerge right away.

Personal computer networking remains fairly immature as a practical technology, according to Kim Myhre, IDC's director of communications industry research programs. Of the 60,000 networks currently operating, he says, at least half were installed within the last year.

With the technology in its youth, managers embarking on network plans need to make their way carefully. Networking veterans' experiences seem to indicate only one absolute requirement for satisfactory results: Any organization that wants its network to succeed must hold a firm grasp on how personal computer networks contribute to overall corporate information goals. ■





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Books, seminars offer more help

Readers who are interested in learning more about personal computer network technology and applications may find the following publications and events helpful.

Publications

Executive's Guide to PC Networks. Eric Killorin and Paula Musich. Hyatt Research Corp., Andover, Mass. 1985.

The Local Area Network Reference Guide. Tom Brooks, editor. Prentice-Hall, Inc., Englewood Cliffs, N.J. 1985.

Localnetter Designer's Handbook. Kenneth J. Thurber, editor. Architecture Technology Corp., Minneapolis, Minn. 1985.

The Netweaver's Sourcebook: A Guide to Micro Networking and Communications. Dean Gengle. Addison-Wesley Publishing Co., Reading, Mass. 1984.

The Networking Software Guide. Gerald Van Dizer. Micro Information Publishing, Burnsville, Minn. 1985.

Operating the IBM PC Networks. Paul Berry. Sybex, Inc., Berkeley, Calif. 1986.

Events

MARCH 24-27, ATLANTA — **Interface '86.** Contact: Interface Group, 300 First Ave., Needham, Mass. 02194.

APRIL 1-3, LOS ANGELES — **Comdex Winter.** Contact: Interface Group, 300 First Ave., Needham, Mass. 02194. **Comdex Spring** will take place April 28 to May 1 in Atlanta, and **Comdex Fall** will take place Nov. 10-14 in Las Vegas.

APRIL 9-10, BOSTON — **IBM vs. AT&T: Local Network Strategic Issues.** Contact: Harvey Freeman, Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424. Also being held April 14-15 in Washington, D.C., April 17-18 in San Francisco and April 21-22 in Atlanta.

NOVEMBER 18-20, SAN FRANCISCO — **Localnet.** Contact: Cynthia Parsons, On-Line International, 989 Avenue of the Americas, New York, N.Y. 10018.

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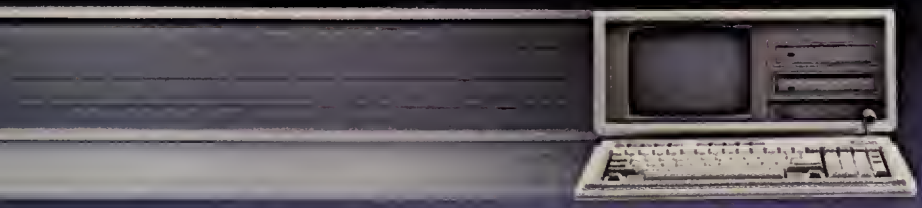

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Quo vadis, MIS?
(or: Where are you heading?)

ILLUSTRATION BY JON MCINTOSH

> ***The mission of MIS management is to facilitate the move of technology out into the office — not to police the effort. Get out in front of the wave of the future or prepare to be tumbled and perhaps to drown.***

By JOHN CONNELL

The current economic malaise in the world of information technology calls for some soul-searching on the part of MIS professionals. The most reasonable explanation for the downturn is that senior management applied the brakes to the buying binge of the past two years and is looking for a return on that investment.

In most cases, the return is not there, or at least it cannot be measured in any traditional way. As a result, fingers point — not at the vendor community for overselling the equipment with claims of extraordinary benefits but at MIS managers for allowing such expenditures to be made.

In their defense, MIS managers maintain that many purchases were made without their knowledge — a classic case of self-indictment. How can one claim to be a professional in information technology and not be aware of the sizable acquisition of computing equipment in one's own company?

Personal computers are often identified as the culprit, brought in under the guise of electronic calculators, test equipment and other devices. Certainly such surreptitious acquisition activities occur, but the dollar value of information technology investments in which MIS management did not participate is dwarfed by investments in mainframes and networks, over which MIS management exercises primary control.

In fact, even when acquiring personal computers, users buy one at a time, while MIS managers buy in bulk.

So the finger pointing at MIS points in the right direction. The truth is that MIS managers, wrapped up in mainframes and large systems, chose to ignore developments in other areas of information technology until the groundswell of publicity and pressure from end users forced them to do so. Thoughtful MIS managers must now ask whether their view of their field, with its strong mainframe orientation, is correct.

In most cases, the answer is no. Information technology goes far beyond mainframes. In fact, the greatest management challenge lies not in the mainframe arena but out in the office. The single most important development in information technology during the last eight years is the move of technological capabilities into the workplace.

Some broadly characterize this expanded machine technology as advanced office systems, distributed data processing, office automation or decision support systems. Others look at specific technologies such as personal computers, teleconferencing, electronic mail or graphics.

Regardless of how it is identified, the movement of technological capabilities into the workplace is the catalyst of change that soon will revolutionize how corporations operate and how they are managed. The big dollars may still go into large central computers, but the real opportunity for performance improvement rests with the machines out in the workplace and the new capabilities they offer to office-based personnel.

A knowledgeable user community

Over the years, MIS management has been entrusted with responsibility for staying on top of technological developments and spearheading efforts to exploit those developments in ways that benefit the enterprise. For the most part, the move of technology out into the office and its significance were either missed or ignored until recently. Then a mad scramble ensued to catch up.

A recent Omni, Inc. survey indicates that MIS has taken control of office automation and the acquisition of machines for the office after often bruising political battles. Exultant or relieved, the computer press declares that its constituency is still on top. But that situation, if it is true, will not last long unless MIS management recognizes the importance of moving technology out and responds in new and imaginative ways.

Why is the move of technology into the office the single most important development in the information technology field recently? Is it because machines that permit such movement have appeared on the scene? That is certainly a key factor, for without word processing machines, personal computers, local-area networks and

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Connell is founder and executive director of the Pasadena, Calif.-based Office Technology Research Group, which is concerned with management issues related to advanced technologies in the office.

the like, the movement would not exist.

Of far greater importance, however, is the impact of these machines. By putting personal computers in the hands of the general work force and helping that group become knowledgeable about the machines' capabilities, a cornucopia of new ideas will emerge on how corporate performance can improve through the use of modern technology.

Experience with personal computers offers graphic testimony supporting that fact. Even the pundits in the field failed to predict the speed at which personal computers would be absorbed into the work force and the highly imaginative machine applications that would emerge.

Most of the mainframe-based systems in use today were designed by professional systems analysts drawing on information gleaned from office-based personnel, the principle being that teaching systems professionals about business was easier than teaching office-based personnel about computers.

The data gathering and system design process was slow, cumbersome and expensive. The delays and costs escalated when efforts were made to integrate systems and establish common data bases.

But it worked. Today, all sizable transaction-based systems are handled by computers and integrated with related systems. In the typical company, most of the work done by systems analysts — upward of 75% of their total work load — concerns modifying these integrated systems to meet new requirements.

Coping with the maintenance backlog in a timely fashion is the foremost concern of systems personnel. In such an environment, the treasure trove of new ideas for streamlining processors and improving one's ability to compete cannot come solely or even primarily from the systems community. Rather, it must come from an enlightened end-user community.

Making it happen

What, then, is the appropriate role of MIS managers in contemplating this move of technology into the office? The answer is simple: Foster it. Encourage it. Make it happen. The move of technology into the office is the wave of the future. Get out in front of the wave. Otherwise, prepare to be tumbled and perhaps to drown. Waves are notoriously inconsiderate of those who stand in their way.

How? Various organizational and operational moves can be made, but the first action is a public declaration — the mission of MIS management is to facilitate the move of technology out into the office, not to police the effort or control it but to help make it work.

Why? Because this public image of MIS management, deserved or not, is just the opposite.

Every effort by MIS management to introduce some sense of order into equipment acquisition, to question data security practices or to standardize operating procedures is seen by the end-user community as MIS' attempt to tighten its personal control.

That image will not change until MIS management publicly identifies itself as a facilitator of technology use rather than a controller and then takes steps to support that declaration.

What kind of steps? After all, most companies have addressed the phenomenon organizationally by establishing information centers to

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> ***What is the appropriate role of MIS managers in contemplating the move of technology into the office? The answer is simple: Foster it. Encourage it. Make it happen.***

Remember When the Robot Was

facilitate technology use. Others installed personal computer support centers, software libraries and various kinds of advanced office systems/office automation groups. Are these not an appropriate organizational response?

The litmus test is this: Is the manager of the information center or the advanced office systems group a logical candidate to succeed the MIS vice-president?

If the function holds such stature in the organization and the incumbent manager is considered so highly, then the organizational response is appropriate. If not, then these centers and groups are a patchwork response to a need that is not properly understood.

Professional support services

Thus, the first step is an organizational one. A senior management position should be created to handle all activities related to moving technology into the office.

Within that purview are the efforts of advanced office systems groups, office automation units, information centers, time-shared computing services, personal computer support centers, software libraries and the various other ad hoc units set up to cope with end-user demands.

The new position should be equal in stature to the manager or managers responsible for traditional MIS and so identified publicly. The incumbent should understand the technology and be able to orchestrate programs that help end users apply technology to solve their problems.

The role is one of facilitating, coordinating and representing end-user needs in the corporate computer-focused steering committees.

One progressive company that already took this step calls the function "professional support services," a good title because the objective is to support managers and professionals as they incorporate technological capabilities into their work lives.

Concurrently, major end-user groups should be encouraged to establish a liaison to interface with this new position and assure that end-user needs are known.

Various organizational alternatives are available for providing such liaisons — user councils, steering committees and the like — but the overall objective should be well understood. This liaison is the first step in enlisting end-user participation in managing information technology.

The principle is clear. If the machines are in the workplace, their ownership should be assigned to those who manage the workplace. When machines are tied together through networks, however, assigning ownership responsibility becomes more difficult.

Machine use in one department can affect another department, for good or ill — hence the need for end-user participation in matters involving technology management.

A multivendor policy

The next step is one of policy. MIS management should express its clear intention to operate in a multivendor environment, as it pertains to the office, even though the traditional MIS approach has been to use a single vendor.

Today's mainframe installations are essentially utilities. The die was cast long ago in the direction of one vendor, and reversing course today is probably not feasible, for both operational and economic reasons.

Not so in the office. Mainframe vendors often did not provide products responsive to customer needs, and the shortfall was made up by other suppliers. That fact should be accepted and efforts undertaken to develop compatible interfaces among numerous vendors rather than opt for a single vendor.

The reasons for such a policy are twofold. First, the MIS community holds the reputation of being a single-vendor advocate and is widely seen as dancing to that vendor's tune, regardless of company requirements. That perception makes all MIS equipment recommendations suspect within the end-user community.

Second, experience with advanced office systems thus far demonstrates that in a single-vendor environment, customers lose. When a vendor holds a product back from the marketplace to protect an established machine base, customers lose. When a vendor fails to resolve incompatibilities

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> ***In a single-vendor environment, customers lose. When a vendor holds a product back from the marketplace to protect an established machine base, customers lose. When a vendor fails to resolve incompatibilities among different product lines, customers lose. When a vendor fails to foresee a need and misses a market, customers lose.***

among different product lines, customers lose. When a vendor fails to foresee a customer need and misses a market, customers lose.

Today's local-area network situation is a good example. While end users cry out for network support, MIS managers sit on their hands waiting for their favorite vendor to get its network act together.

In a multivendor environment where the laws of competition prevail, such shortfalls are quickly corrected, or the vendor does not survive.

Coping with change

The manager of professional support services should move quickly and, in a joint effort with human resources personnel, develop comprehensive training programs for the end-user community.

Training encompasses several areas:

- Providing instruction in actual machine use.
- Providing access to and supporting the use of various software packages and aids.
- Working with experienced users to exploit the full potential of machines.
- Retraining personnel whose work lives changed significantly because of the introduction of technology.

The objective of training should be to help people cope with the challenge of technology in the workplace.

When personal computers first appeared, MIS managers held back from acquiring them, waiting for their favorite vendor to enter the market. When that event occurred, the machines offered were bought in such large numbers that they are now an industry standard.

Unfortunately, the favorite vendor's machines are very difficult to use and require extensive training. In fact, if the dollar value of time spent in training is factored into the price of the machines, these personal computers are the most expensive on the market.

As a result, management must pay strict attention to training quality to ensure that end users really understand the machine.

Further, the time and difficulty involved in gaining proficiency with these machines leads to the one-application syndrome. End users, having invested far more time and effort than they imagined in learning one application, are reluctant to go through the same process to learn a second.

Consequently, the machines are not used to their full potential, and the end users gain minimal benefits. Since they were involved in selecting the machines, MIS managers bear a special responsibility to devise training approaches that will foster expanded machine use.

Finally, there is no question that technology's move into the office will affect job structure and content, that some functions will no longer be necessary, that organizational relationships will change and that new work skills will be required.

As enlightened advocates of office systems use, managers of professional support services should be leaders in ensuring that training programs are in place to keep people from becoming obsolete.

In the modern office, change is the only constant; those who introduce and foster change are obligated to help people cope in a positive way. That obligation was ignored in the days when computers were being introduced as a substitute for clerical labor. Today, when machines are being introduced to augment human performance, the obligation must be met.

Office productivity

Moving technology into the office is not an end in itself. Rather, it is part of a continuing effort to improve office productivity.

The term "productivity" is an anomaly when applied to the office because it implies measurement, and much of the work done in offices, especially that of managers and professionals, is not readily susceptible to quantifiable measurement. To manage, however, one must be able to measure in some way.

Offices, the people who work there and the equipment they use now constitute a major element of corporate expense — in most cases the largest drain on corporate profits. In many companies, new capital investment per office worker exceeds new capital investment per worker in the plant.

To say that the contribution of office personnel to the enterprise cannot be measured is to confess that offices cannot be managed, regardless of their impact on corporate profitability.

Regrettably, that is exactly the case. Witness the rash of staff reductions announced over the past few years. Supposedly astute management trumpets its plan to become lean and mean by firing office-based personnel.

Left unanswered are questions about why these people were employed in the first place: What measurement system was used to justify hiring these individuals? What measurement system tracked their contribution to the enterprise? What measurement system determined the corporate impact of letting them go?

The answer: None. When it comes to the office, management works by the seat of the pants.

MIS personnel are exposed in oblique ways to this problem of office management, but not directly. The typical systems approach is to carve out a portion of office work susceptible to mechanization, put it up on computers in a data center and measure the results on a before-and-after basis. Sometimes those results can be identified in total office performance, but most times they cannot because no measurement system is in place.

However, when machines are placed in the office and assigned to managers and professionals, their impact cannot be carved out and measured. The measurement must be based on total investment in both the individual and the machine vs. the return to the enterprise. The upshot is that MIS personnel who introduce technology to the office must also get involved in issues of office management and productivity.

This development is fortuitous because the MIS community has gone to great lengths to develop measurement systems within its own area of responsibility with considerable success. The enterprise thus generated will be helpful in developing comparable systems in the general office.

The crux of the matter is this: People are a long-term investment, regardless of the accounting systems that treat them as a discretionary expense. Like any other investment, investing in office systems is an attempt to increase the return on the investment in people. Systems are needed that will quantify and track that return.

Senior management's disenchantment with PCs and other office systems, which triggered the current slump in the computer industry, stems not from dissatisfaction with machine capabilities but from frustration with the inability to measure their impact on corporate performance. The challenge facing the new manager of professional support services is to address and help solve that measurement problem.

Telecommunications awareness

The heart of office technology, in fact, of all information technology, is telecommunications. Information must not only be processed, it must be moved. The benefits associated with interconnecting machines through networks are so great that one must question the competence of MIS managers who are not moving aggressively to achieve that objective.

Part of the problem lies with the vendor community — phantom products, lack of compatibility, local-area network/private branch exchange controversies and the like. But most of the problem rests with the MIS community, which has been inexcusably slow in supplying network support to end users.

> ”
>
> ***In the modern office, change is the only constant; those who introduce and foster change are obligated to help people cope in a positive way.***

One of the first duties of a professional support services manager is to rectify that situation — to act on behalf of the end-user community in arranging for improved telecommunications support.

To get that support and to ensure telecommunications receives the attention from senior management that its importance warrants, its stature must be raised. In too many cases, telecommunications managers are classified as technicians rather than strategists; their organizational position reflects that orientation. Lip service may be paid to the key role that telecommunications plays in information technology, but organizational placement seldom reflects that fact.

Preserving traditions

Carving out of today's information technology organizations those functions that support end users would appear to downgrade the more traditional MIS functions, such as systems design, programming, data base administration, software research and data center operations. On the contrary, it allows professionals to concentrate on these important activities without being distracted by amateurs.

To today's backlog of systems work must be added a burgeoning demand for new applications generated by a knowledgeable end-user community. Fourth-generation languages, prototyping and a host of other techniques must be applied if

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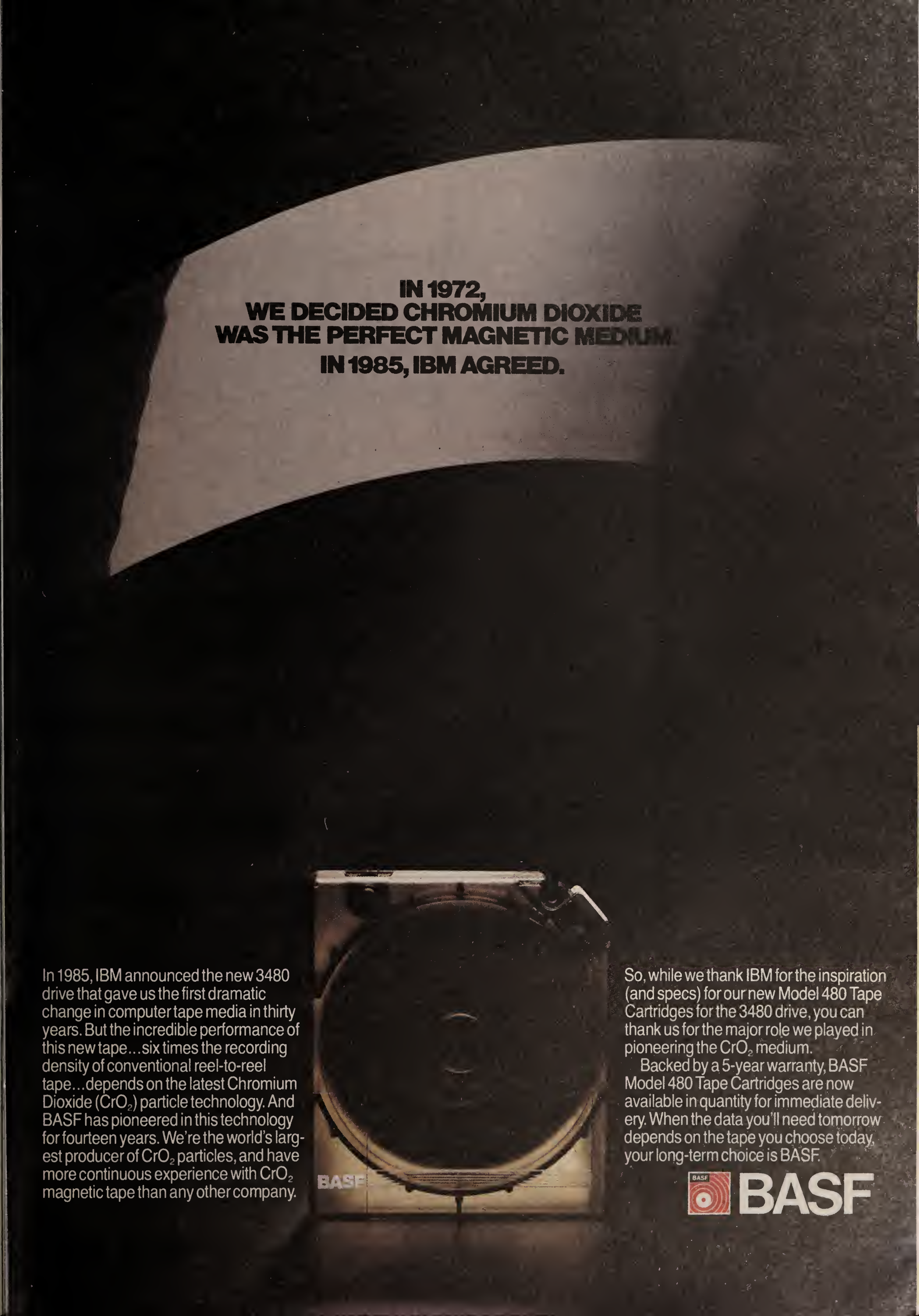

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this work load is to be handled in an expeditious fashion. As networks are introduced and micro-mainframe interface problems resolved, the demands placed on data centers will be unprecedented.

Most of those demands will involve access to mainframe-stored data that must be organized to ensure proper response. Answering these demands in a timely fashion will tax the talents of the best professionals in the field and provide a challenge of major proportions.

Adding to this challenge is the change in the kinds of systems demands emerging from the end-user community. Over the years, computers and other office systems primarily have streamlined processes such as payroll billing, order entry and inventory control.

Today, using these machines to improve one's competitive ability is receiving greater emphasis, and the systems requirements thus generated can be very different. These requirements often involve placing machines on customers' premises, designing systems that tie into the customer's system and dealing in benefits that are not readily measurable.

Over the long term, however, their benefit to the enterprise could exceed by far the benefits received from streamlining processes.

Information management

MIS managers have long proclaimed themselves to be involved in information management. They are not. They have been involved in data management, and in most cases, they have done a reasonably good job of it.

But the world of information technology today goes far beyond data. Since the advent of word processing, machines have been dealing with text. In the most recent breakthroughs, machines create images and store them on microfilm or optical disk.

Information management is concerned with all three forms of information processing. In practical terms, information management means aggregating, processing and maintaining information in a cost-effective way and making that information readily accessible.

However, systems involving the processing of data, text and images must wrestle with three different, and to some extent mutually exclusive, information retrieval techniques.

Developing an information retrieval strategy that accommodates these three techniques and at the same time offers the greatest possible flexibility in identifying search criteria remains the real challenge facing practitioners in information management.

New directions, a new role

So where, then, is MIS going? The answer — in many new and exciting directions:

- A new mission of facilitating the use of technology by others, rather than merely providing processing services.
- A new organizational thrust that provides equal status to the new professional support services group, the telecommunications organization and traditional MIS services.
- The opportunity to spearhead programs for training and retraining.
- The chance to tackle the office productivity improvement problem and design measurement systems in support.
- Bottom-line contributions through systems aimed at improving competitive posture.
- The challenge of information management in the full sense of the term.

Will MIS managers respond? That remains to be seen. The comfort of the status quo is sometimes overwhelming.

The change agent may well be the current emergence of a new role — the chief information officer. This senior management assignment involves corporatewide responsibility for information policy and its implementation.

Today's MIS managers would appear to be prime candidates to succeed to such a position, but in a number of cases, the assignment has gone to someone else. The reasons center on corporate perceptions that these MIS managers are too wrapped up with data centers and related activities, not sufficiently responsive to end-user demands and generally out of touch with the business.

If that perception is to be corrected, now is the time to move. ■

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'If the phone company owned the Pick system, there would be no Unix.'

— Ted Sabarese, Ultimate Corp.

Pick operating system makes converts of users

Loyal Pick system users describe their discovery of the operating system in terms akin to born-again Christians talking of being reborn — they have already found the answer others are looking for.

By PHILIP GILL

Name a multiuser, multitasking operating system that is highly portable, is available from a number of different vendors on a wide range of processor types, maintains an enthusiastic, almost cult-like following of dedicated users and has the makings of an industry standard.

If you answered AT&T's Unix System V, you're wrong. Well, maybe only half wrong. While Unix fits the first three criteria, a second, lesser known operating system — the Pick system, designed and developed by Pick Systems in Irvine, Calif. — fits them all.

Pick's popularity stretches coast to coast and covers a variety of companies and users, who find it handles heavily intensive data base applications with ease and is better at accessing unstructured data than its more visible rival.

While Unix system promoters have loudly trumpeted that operating system's march into commercial markets, a small but loyal band of Pick system users have been quietly going about their business.

Loyal Pick system users — many of whom describe their discovery of the operating system in terms akin to the way born-again Christians speak of being reborn — believe they have already found the answer to the business problems that computer users and vendors alike say they have been trying to resolve.

To these users at least, and to a growing contingent of hardware and software vendors currying their favor and dollars, the Pick system and its variants are better qualified to serve as an industry standard for multiuser business computer systems than the more heavily touted Unix.

Notes one vendor, Ted Sabarese, president of Ultimate Corp. in Clark, N.J., "If the phone company owned the Pick system, there'd be no Unix."

Vendor claims aside, Pick system users support their enthusiasm for the product with some powerful and convincing reasons. A few of the benefits they cite include ease of use for both users and programmers, application adaptability and flexibility, a strong, integrated relational data base management system (DBMS), a high degree of portability across processors, exceptional data manipulation and handling capabilities and the ability to customize off-the-shelf applications on the fly.

Some users describe the operating system simply as resembling a giant electronic spreadsheet, although

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Gill is a free-lance writer based in San Mateo, Calif. Previously, he was editor in chief at Unix/World *magazine.*

ILLUSTRATION BY TAMAR HABER SCHAIM

> *'Pick is still ahead of, or is certainly not surpassed, in terms of handling files. And businesses run on files, not on repeated mathematical iterations.'*
>
> — Bill Anderson
> Caty Industries

they quickly add that it is considerably more complex.

"The Pick operating system gave us mainframe power on a minicomputer," says Bill Anderson, assistant treasurer at Caty Industries, a $400 million diversified manufacturer and food products concern that installed its first Pick-based computer about 10 years ago.

Headquartered in Elgin, Ill., Caty Industries currently has installed throughout its various operating companies 16 or 17 Microdata Corp. (now McDonnell Douglas Computer Systems Co.) and Ultimate computers performing such tasks as order inventory, accounts payable and receivable and manufacturing control.

Anderson says the Pick system removed any preconceived notions users and programmers held about the way data could be stored and manipulated. "It has no walls," he adds.

A loyal Pick system user, Anderson maintains that even today, Pick "is still ahead of, or is certainly not surpassed, in terms of handling files. And businesses run on files, not on repeated mathematical iterations."

Stacking up against Unix

To understand better what the Pick system is and is not, it is perhaps best to see the system as it stacks up against Unix.

The confusion between the Pick and Unix systems is understandable, as is the potential for competition and rivalry, given the remarkable number of similarities between the two systems.

These include the following:

History and origins. Both the Pick and Unix systems initially were developed about 16 years ago. In their first iterations, both were developed as research projects, not as commercial end-user products.

Unix was developed in the early '70s as the end result of a purely academic research exercise by two AT&T Bell Laboratories programmers, Ken Thompson and Dennis Ritchie.

At that time, the two conceived the Unix system as a unified interactive operating system for researchers and engineers — and that was all. Initially, it ran only on Digital Equipment Corp. PDP minicomputers, although it was quickly ported to other DEC systems.

At the beginning, neither AT&T nor its programmer/inventors envisioned Unix as a commercial operating system.

That push came later, beginning with the licensing of the first commercial vendor, Yourdon, Inc., in 1975. Implementation on micros followed in 1980, culminating with AT&T's 1984 entry into the commercial computer business.

An aura of mystery and legend surrounds the origins of the Pick system, and an exact date is difficult to determine.

According to legend, the Pick system actually came into being in March 1965, a date that its developer, Pick Systems founder Richard "Dick" Pick is said to celebrate every year with a birthday party.

However, every Pick-based system reputedly records Jan. 1, 1967 as the system's official start date, regardless of when it was actually installed and booted up.

At the time, developer Pick was working on a U.S. Army research project at TRW Corp. in Southern California.

That project reportedly became the genesis for the first commercial implementation of the Pick system, which appeared on Microdata minicomputers in 1973

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as the Reality operating system.

User reverence. Users and vendors alike refer to the two products reverently, always adding a "the" before the name and a "system" after it. So, for example, you should say "the Unix system" and "the Pick system," not just "Unix" and "Pick."

Multiuser capabilities. Both the Unix and Pick systems are multiuser operating systems that have their largest installed bases on superminicomputers, minicomputers and Motorola, Inc. 68000-class supermicros. Both are also available for personal computers and mainframes, two categories in which their respective claimed usages are growing.

In the Unix system's case, Microsoft Corp. Xenix and Venturcom, Inc. Venix are but two of the half a dozen or more Unix versions for the IBM Personal Computer, PC XT, PC AT and their clones.

Meanwhile, Pick Systems itself supports PC XT and AT versions, while Cosmos, Inc. markets an IBM PC-based DBMS called Revelation that is based on the Pick system.

On mainframes, Amdahl Corp. markets its UTS operating system, a licensed Unix System V port, for IBM 370-type processors, while Systems Management, Inc., a Rosemont, Ill., Pick software vendor, sells turnkey Pick systems based on IBM 4300s.

The need for standards. Both systems suffer from a common problem: the need for a common and mutually agreed-upon definition of what constitutes a Pick or Unix operating system.

Individual vendors of Unix and Pick systems have implemented both standard functions and special, proprietary enhancements in such a way as to create substantial differences in the various "flavors" of each operating system.

These differences produce incompatibility problems for some users, and the resulting disparity reportedly makes switching computer brands intimidating and difficult.

However, both now have formal, ongoing standards efforts that define common operating system components and compatible extensions. These efforts will enable end users to move data and applications across diverse systems from various manufacturers with minimal conversion efforts.

Target markets. Pick and Unix systems repeatedly target two main user bases: operating system platforms for small business system solutions tailored to specific vertical market applications and generic platforms for multiuser office systems for small to medium-size businesses and departments within Fortune 1,000 firms.

Distribution channels. Indirect marketing channels, usually value added, are the preferred distribution route for both Pick and Unix at this time, although direct sales by major vendors to Fortune 1,000-caliber users appear to be growing for each.

A typical distribution scenario for either system goes like this: A hardware manufacturer or reseller licenses the operating system from the appropriate source, either AT&T for Unix or Pick Systems for Pick. The hardware vendors then port the operating system to their hardware and ship it out the door to third parties for resale to end users.

Local dealers — sometimes value-added resellers — do the actual selling, installation and after-sale support as well as occasionally providing special vertical market applications software. This scenario applies to sales for both large and small corporations.

Work-alike operating systems. Work-alike or look-alike operating systems are those that resemble a licensed Unix or Pick system in function, capabilities and sometimes even commands but are not based on licensed source code from AT&T or Pick Systems.

The Unix system market offers a dozen, or perhaps more, work-alike operating systems, including Mark Williams Co.'s Coherent, Alcyon Corp.'s Regulus and Whitesmiths, Ltd.'s Idris.

Most apply to types of applications at which the Unix system is not necessarily good, such as real-time process control and factory automation, or for hardware environments, such as personal computers, where the Unix system's large overhead would make the system too expensive.

The Pick system marketplace, on the other hand, has

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There's an IBM graphics workstation ready to make almost any desk a Smart Desk. The IBM 3270 Personal Computer AT/G, for example, lets the user interact with the host computer or work in the stand-alone mode. With

The Smart Desk from IBM

> ***Vendors of Unix and Pick systems have implemented both standard functions and special, proprietary enhancements in such a way as to create substantial differences in the various "flavors" of each system. . . . The resulting disparity reportedly makes switching computer brands intimidating and difficult.***

only two known work-alike systems at this time — McDonnell Douglas Computer Systems' Reality operating system and Prime Computer, Inc.'s Prime Information. These systems came about as a result of historical considerations rather than functional ones.

Prime Information is a Pick-compatible DBMS and application development tool that runs on top of Prime's Primos operating system. According to the company, 25% of all Prime systems are now shipped with the product, accounting for $7 million of a total $770 million in software revenue in 1985.

The Prime Information system, originally developed by Dezcom, Inc. in Seattle, is not based on licensed Pick Systems source code.

The Reality operating system was actually the first commercial implementation of the Pick system. However, Pick Systems and Microdata formally severed their relationship a decade ago.

Thus, the Reality operating system offers Pick-like capabilities and is in fact widely installed, but it no longer is based on licensed Pick Systems source code.

Adding up the differences

Although Pick has many similar characteristics to Unix, the two systems are worlds apart, according to Pick system users. Still, not all the differences add up in the Pick system's favor.

Product orientation. Pick system users and vendors point out what they say they believe is the most important and essential difference between the Pick and Unix systems — that from the outset, Pick's orientation targeted the commercial business end user, while Unix was developed by scientists and engineers for their own kind.

The strong data base orientation of the Pick system and its ease of use make it a viable, long-term operating system, Pick users maintain. The Pick system, more than one user notes, is strictly business oriented. One users adds that it "wouldn't even be able to do the scientific and engineering tasks at which Unix is so good."

Relational DBMS. At the heart of every Pick system is an integral relational DBMS. So strong are the Pick system's relational capabilities that they overshadow its other characteristics, several analysts maintain.

"It's not really an operating system at all," says Omri Serlin, president of Itom International Co. in Los Altos, Calif. "It's a fourth-generation language. An operating system is a misnomer. The Pick system is a small data base management system with an associated query language that enables the nonexpert user to retrieve data."

Operating system or not, the Pick system's relational DBMS is the core reason many users cite for purchasing their systems.

"The common data base was the primary reason for picking the Pick system," says John Woods, president of Western Multiplex Corp. in San Carlos, Calif. Western Multiplex is a small developer and manufacturer of analog multiplexers.

The firm uses a McDonnell Douglas Computer Systems 4700 for a wide array of business applications, including order entry, financial analysis, inventory control and even some word processing, although Woods says that function is being moved to a personal computer because of the availability of higher caliber word processing software in that environment.

Needless to say, Unix systems do not come with a built-in relational DBMS. Although a crude form of the

speak faster than words.

What follows are some of the many, many words it would take to describe what's on the computer's screen if a graphical representation could not be produced. And even these aren't enough. Here's what we mean. This display is the Transit Time by Time of Day Graph created by the Network Performance Monitor program product. The graph displays a comparison of host response time for terminals in an SNA network. Host transit time is the time it takes for the host to process a request by the operator and output a response to his terminal. We are looking at the host transit time (response time) for three terminals: TO2DO1O1, TO2DO1O4, and UO2CO1O1. The data covers a 15 minute period on December 12, 1985, starting at 13:50 and ending at 14:05. The data was plotted based on 30 second intervals. During the first five intervals or 2.5 minutes, Terminal TO2DO1O4 experienced host transit times of 0.05, 0.70, and 1.25 seconds. Terminal TO2DO1O1 experienced host transit times of 1.30, 1.25, 2.90, and 0.10 seconds. Terminal UO2CO1O1 experienced host transit times of .40, .10, 1.60, 1.70, and .05 seconds. Many factors have effect on response time, such as the complexity of the operator request, host processing load, or the volume of data following in and out of the host. This span has the greatest number of operator interaction which could account for the increase of host transit times for the period. During the next five intervals or 2.5 minutes, terminal TO2DO1O1 experienced host transit times of 1.35, .20, .40, and .05 seconds. Terminal TO2DO1O4 experienced host transit times of .70, .12, and .10 seconds. Terminal UO2CO1O1 experienced host transit times of .40, .25, .35, and .05 seconds. During the third five intervals or 2.5 minutes, Terminal TO2DO1O1 experienced host transit times of .05, .40, .55, and .05 seconds. Terminal TO2DO1O4 experienced host transit times of .20, .05, .35. and .50 seconds. Terminal UO2CO1O1 experienced host transit times of .20, .40, .05, and .45 seconds. Response times during this period seem to be normalizing. This could be accounted for by a reduction in the complexity of the transactions being processed. By inspecting each five interval periods in this fashion we can tell whether a user is receiving acceptable response times from the host. We can also tell if a set of users is receiving the same levels of resource utilization. If, for example, one user out of three was experiencing bad response time we might investigate whether his priority levels are set correctly or look at other graphs to isolate the problem.

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University of California at Berkeley's version of the Ingres relational DBMS is sometimes included in some Unix system ports, it is not easily accessible to most users.

Ease of use. Because of the Pick system's strong relational DBMS, end users report that the operating system is "amazingly" friendly to use. Unix, on the other hand, usually depends on applications software to hide its complex command structures from many naive end users.

"I always say that you can put data in vertically and take it out horizontally," Western Multiplex's Woods says. "The ease of use with which we can get the data in and out is tremendous. The configuration is such that you don't need a programmer to create new programs."

Virtual memory and demand paging. The Unix system will soon receive virtual memory and demand paging capabilities with the release of System V, Release 3, sometime later this year, while Pick Systems says the Pick system has always had virtual memory and demand paging capabilities. In addition, the Pick system offers variable-length files, records and fields.

Multiuser/multitasking capabilities. Just as the Unix system will be catching up with the Pick system's virtual memory and demand paging capabilities, so too has Pick only recently caught up with the Unix system's multitasking features.

Incorporated into the first Pick Open Architecture release last year was what Pick Systems calls a leveraging feature. This reportedly enables a single user on a Pick system-based computer to produce multiple background tasks while performing a separate task in the foreground on his terminal.

The open architecture version of Pick was first shipped to Pick licensees in March of last year; only one vendor has begun shipping it to end users: Pick on Pinnacle, Ltd. of the UK. Nine other vendors signed new licenses for it and are now in various stages of porting and development. A Pick Systems spokesman says the company expects four or five licensees will ship to end users in the next 12 months.

System administration and maintenance. Every Unix system, even a single-user system, requires someone who is technically astute enough to monitor its performance and keep it running smoothly. These people, called system administrators, are often technical types with few people skills and therefore are sometimes blamed for the ominous wizard images that surround Unix and its administration.

For single-user machines, the user maintains and administrates the system. In small businesses or departments in large corporations, a user well versed in the ways of the Unix system may become a part-time, ad hoc systems administrator, or a formal systems administrator may be hired on a part- or full-time basis. Larger Unix systems — those running on minicomputers and mainframes — often require a full-time staff made up of several members.

The reverse is true of the Pick system. Many Pick system users report little if any requirements for formal systems administrators.

For instance, CBS Records International, the international audio, video and record distribution arm of CBS in New York, has Pick systems in place in New York, Miami and Puerto Rico as well as at remote sites in eight foreign countries.

Rich Elmore, an independent consultant who helped CBS Records implement these Pick systems, says

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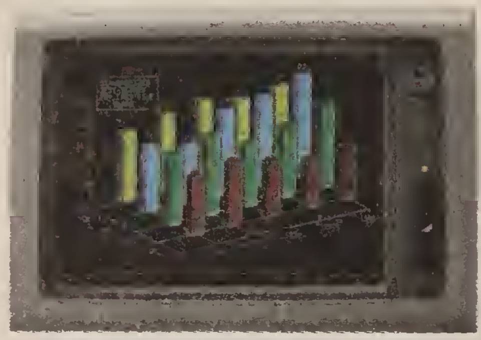

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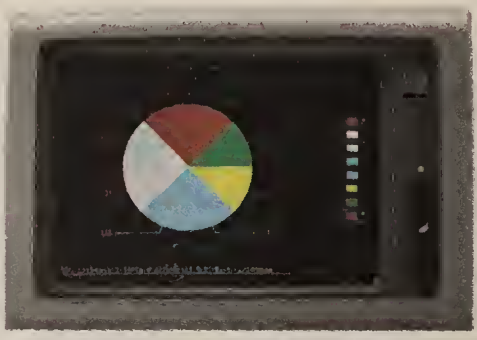

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that several of the remote sites have no on-site MIS support at all.

A second user, Doug Warman, vice-president, operations, at Dorado Systems, Inc., a Hayward, Calif., card reader security systems manufacturer, notes that the only maintenance that the firm's McDonnell Douglas Computer Systems computer requires is a one- or two-hour visit once a month from a local Pick system programmer.

These two users are not alone. George Ridgeway, president of Systems Management, Inc. in Rosemont, Ill., which sells the Pick system for IBM 4300s, claims that 40% of Systems Management's users retain no on-site MIS support staffs.

Pick applications and users

Pick system applications run the gamut from manufacturing control to order entry and inventory to word processing and office automation. Most, however, tend to share one common trait — a strong orientation toward data bases and an emphasis on data manipulation and retrieval.

On the minus side, Pick users wish vendors would come up with more state-of-the-art word processing and office automation software, like that available under IBM's PC-DOS and Unix systems. Western Multiplex's Woods notes that his firm moved word processing off its Pick system to an IBM PC so the company could take advantage of the sophisticated word processing software available for the PC environment but not for Pick system users.

Users also say the Pick user community needs to be brought up to date on the communications front as well. There are few products available for IBM 3270 and Systems Network Architecture protocols, for instance.

Vertical markets appear to be the specialty of many Pick systems. For example, at least 20 manufacturing control programs are said to exist for the Pick environment. Also, Shared Union Systems, Inc. in Fort Washington, Pa., markets a turnkey Pick system for labor unions.

Pick systems have also made it big

Licensed Pick operating systems

Company	CPU/OEM*	Year
Microdata Corp.	Microdata Reality	1973
Intertechnique	Intertechnique Multi-6	1978
Ultimate Corp.	Ultimate/Honeywell Level 6	1979
Pick Systems	Evolution/Intertechnique Level 6	1979
Automatic Data Processing, Inc.	ADP/Hewlett-Packard 3000	1980
Applied Digital Data Systems, Inc.	ADDS Mentor/Zilog Z8000	1981
Ultimate	Ultimate/DEC LSI-11	1982
Datamedia Corp.	Datamedia 932/Motorola 68000	1982
Altos Computer Systems, Inc.	Altos 586/Intel 8086	1982
General Automation, Inc.	General Automation Zebra/ Motorola 68000	1982
(Publication withheld by licensee request)	IBM 4300	1982
Computer Distributors, Inc.	IBM Series/1	1982
Systems Management, Inc.	IBM 4300	1983
Computer Distributors	IBM Personal Computer	1983
Systems Management	IBM CS9000/Motorola 68000	1983
Pertec Computer Corp.	Pertec Sabre/Motorola 68000	1983
Tau Engineering, Inc.	Tau/Motorola 68000	1983
Wicat Computer of Australia Pty. Ltd.	Wicat/Motorola 68000	1983
Climax Computer Corp.	Climax/Motorola 68000	1983
CIE Systems, Inc.	CIE 680 series	1983
Pick Systems	IBM PC XT	1983
Fujitsu Microelectronics, Inc.	Fujitsu/Intel 8086	1984
Nixdorf Computer Corp.	Nixdorf 8890 VM	1984
American Information Systems Corp.	National Semiconductor 32032	1985
Xmark Corp.	Turbo-Tower Jr./Intel 8088-2	1985
Pick on Pinnacle, Ltd.	Pinnacle/Motorola 68000	1985
Pick Systems	IBM PC AT/Intel 80286	1985
Eagle Computer, Inc.	Eagle SST	1985
Electronique Serge Dassault	SM90	1986

* Original equipment manufacturer

Source: Pick Systems

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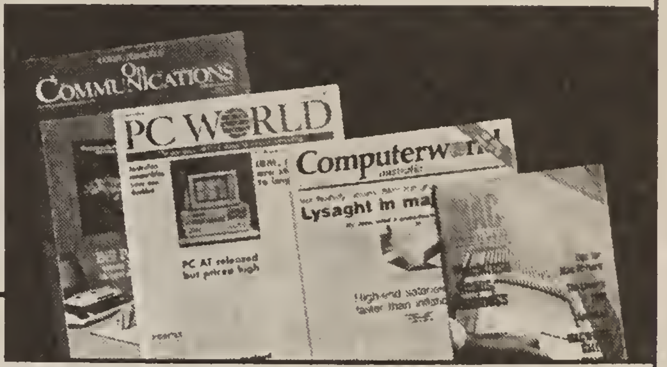

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Rich Lauer, Pick Systems vice-president of sales and marketing, says the typical Pick system-based computer is a supermicro, mini or supermini with eight to 10 terminals attached. Lauer, who says there were 60,000 licensed CPUs running the Pick operating system at the end of 1985, reports that more than 50% of Pick installations have no professional DP support on-site.

This does not mean that Pick systems have been locked out of Fortune 1,000 companies, however. Ultimate, with 1985 sales of $107 million and an installed base of 4,000 systems, says that 30% of its users are Fortune 1,000 companies.

Ultimate's customers include the Bank of New York, the CBS News division of CBS in New York and Florida Power & Light Co., which services 2.6 million users from its Miami headquarters.

Pick systems from other hardware manufacturers are in place at Arthur Andersen & Co. in Chicago, Anheuser-Busch Companies, Inc. in St. Louis and UK-based Plessy Ltd., to name a few.

Pick futures

As an industry standard, the Unix system is a reality. The future status of Pick is not so secure. Heavy money is betting that the Pick system's days as a stand-alone operating system are numbered and that it will end up as a super data base management system guested in a Unix system environment. Nonethless, the Pick operating system continues to thrive.

However, enthusiastic support from users alone will not and does not ensure Pick's long-term survival. In fact, some analysts say the future of the Pick system as a stand-alone operating system is in doubt, especially considering the massive

SMA standard calms vendors

If there is one area in which Pick Systems users seem to chide the computer community's hardware vendors, it is standards. In fact, their tune sounds similar to the chorus often raised against the Unix system.

Each vendor of hardware systems that run the Pick system or a Pick look-alike has implemented the operating system differently. Sometimes the differences are minor; sometimes they are substantial. These alterations make moving from one vendor's Pick-based hardware to another's intimidating at least and difficult at best, some users maintain.

"We're rather locked in to the Microdata Corp. [computer line]," notes an otherwise devoted Pick user, John Woods, president of Western Multiplex Corp. in San Carlos, Calif.

Woods and other users should not feel hemmed in much longer, according to the Spectrum Manufacturers Association (SMA), a group of Pick hardware vendors. To overcome the disparities in Pick system implementations and the resulting incompatibilities, a group of Pick and Pick-like vendors have banded together to write the SMA Spectrum Standard.

According to Len Mackenzie, SMA board president, the standards board is chartered with two goals. First, he says, SMA seeks to "expose and promote the value of Pick and Pick-like systems." Mackenzie, also president of General Automation, Inc., an Anaheim, Calif., Pick systems vendor, explains that growth in the Pick market had slowed recently, leading some SMA members to promote the idea of a Pick standard as one way to expand their markets rapidly.

Secondly, SMA seeks to define a common set of software and facilities that make up a Pick system and how the system interfaces with such tools as communications networks and allocates disk space and formats, he says.

More important to users will be the concurrent publication of the first Pick system standard, Spectrum Standard Level 1. Spectrum Standard Level 1 is the baseline of the emerging Pick standard, Mackenzie says. At the time of the standard's publication, SMA will also release tentative publication schedules for Level 2 and Level 3 of the Spectrum Standard, he adds.

The forthcoming Spectrum Standard is spiritually akin to AT&T's highly publicized System V Interface Definition in that it seeks to define a common platform of functions upon which individual vendors can then build special or unique extensions.

That is where the similarity ends, however, Mackenzie claims. He observes that the Spectrum Standard will derive from the mutual consensus of its members, not from one vendor passing down its vision of what the standard should be to the others.

SMA counts as its members 17 of the 26 vendors that currently sell hardware running a Pick or Pick-like operating system, including Applied Digital Data Systems, Inc.; CIE Systems, Inc.; Cosmos, Inc.; Fujitsu Microelectronics, Inc.; General Automation; Intertechnique; McDonnell Douglas Computer Systems; Nixdorf Computer Corp.; Pertec Computer Corp.; and Wicat Computer of Australia Pty. Ltd.

In addition, three other vendors have applied for SMA membership, but their names are being witheld until International Spectrum USA, a conference of Pick users, meets this week in Las Vegas.

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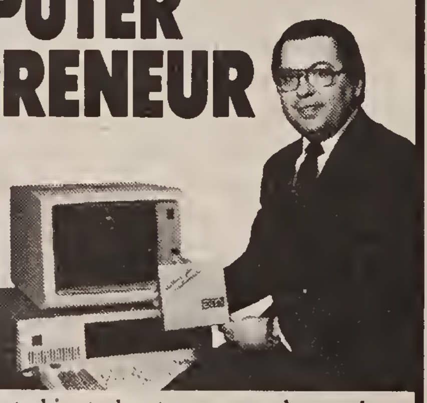

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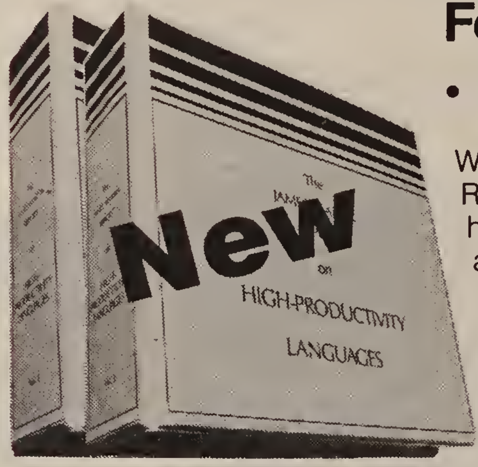

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marketing onslaught that purveyors of Unix-based systems, led by AT&T's enormous advertising budget, are pursuing.

Brad Thorpe, an analyst at International Data Corp. in Palo Alto, Calif., sees only a handful of operating systems — PC-DOS, Unix, DEC's VMS and IBM's MVS and VM are the most likely — surviving long enough to achieve industry-standard status.

The Pick system is not among them.

Thorpe asserts that the Pick system's future is more like that of the BUNCH companies' proprietary offerings.

"There's less and less room for a proprietary operating system such as Pick," he maintains. "The BUNCH companies like to have proprietary operating systems, but they are all gearing up toward the Unix system. They are maintaining their proprietary operating systems so that their loyal customers won't feel abandoned and because they want to have a backup in case something happens to the Unix system."

"It's a niche product and will remain a niche product," Itom International's Serlin predicts.

Still, users say they will remain loyal and that they believe the Pick system will survive no matter what.

"It's so good, there's got to be a place for it," Dorado Systems' Warman says. "If you can compare using software to driving a car, this car is real nice to drive."

Some also question why a product they believe is so good has not been more heavily promoted and widely accepted. It is a question for which most do not have an answer, however.

Pick and Unix to wed?

Caty Industries' Anderson says he would not mind if Pick and Unix merged into some kind of third entity where both could be used for the kind of applications at which they excel — Pick for data base work and Unix for word processing and office automation functions.

The possibility of a marriage between Pick's exceptional DBMS and file handling capabilities and Unix's text and word processing orientation, more powerful computers, wider acceptance and fatter promotion budgets has fostered speculation for some time now. It remains, at this time, however, just courtship. No formal engagement has been announced.

Pick Systems' Lauer, however, hints broadly at a future Pick-Unix system bridge or link, perhaps along the lines of a Pick system implemented as a data base on top of a Unix system. Although he would not be specific, numerous reports have surfaced that Pick Systems has such a product in the works for AT&T.

This would be an adjunct or addition to the Vmark Computer, Inc. Pick emulator AT&T now offers on its Unix systems, according to those reports. Pick Systems is suing Vmark over its Pick-Unix system implementation, charging copyright and trade secrets infringement and unfair competition.

Curiously, the largest number of Pick system licenses are not for Pick systems running in native mode but for a stand-alone operating system. Cosmos' Revelation DBMS for the IBM PC and compatibles is the most widely established Pick implementation, with 15,000 units installed since its introduction in 1983, according to Pick Systems. Cosmos actively targets Revelation to the home market in addition to business customers.

Intertechnique boasts the second largest customer base with 5,500 users; Ultimate and Applied Digital Data Systems, Inc. come close with 5,000 users apiece; and General Automation, Inc. and Prime are next with 3,000 customers each, Pick Systems says.

Nonetheless, even if a marriage between the Pick and Unix systems does take place, it will not matter to the Pick system's devoted users. They say they will still go about their work as usual, believing that what they have found still is the answer to their computing needs and wondering why others do not seek the same salvation. ■

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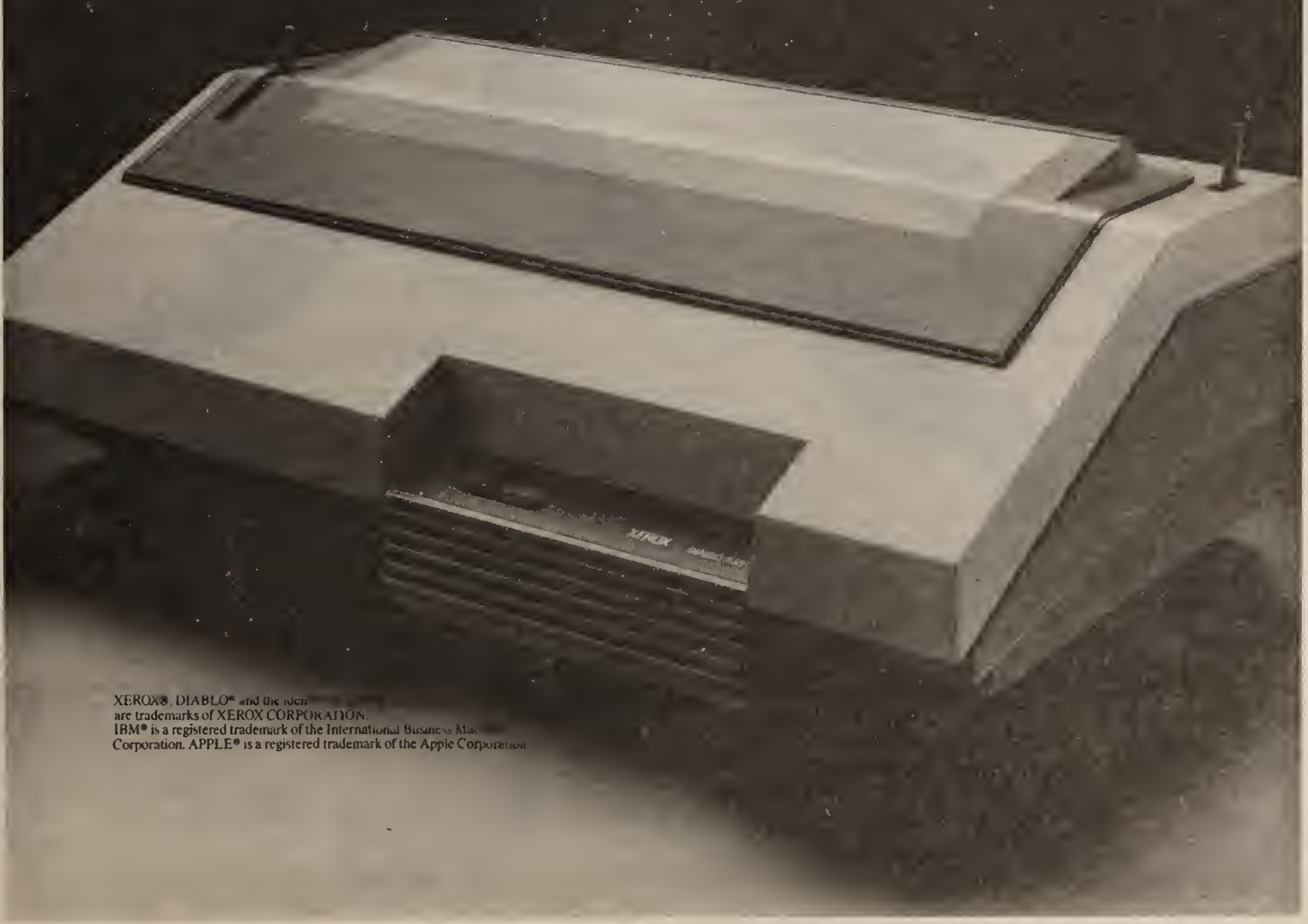

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Recently GTE and United Telecommunications Inc. agreed to establish a joint venture which would merge their respective long distance voice and data communications businesses. One result of the proposed joint venture will be the merger of two long-established data communications companies. GTE Telenet and US Telecom—Data Communications (formerly Uninet) will combine to form the data communications business of the new US Sprint Communications Company. The new company hopes to receive the necessary legal and regulatory approvals in time to formally begin operations around July 1st.

Why the joint venture?

Today's telecommunications market is constantly changing. Our proposed joint venture will allow us to offer our customers even more flexibility in taking advantage of these changes. And combining our technology will bring you an even wider range of data communications capabilities to choose from. While the integration of our sales and services operations will increase the level of customer service.

And when the state-of-the-art fiber network now being installed by US Telecom throughout the U.S. is combined with our data capabilities, we'll also be able to bring you closer to the world of voice/data/video integration.

But what about now?

Until the joint venture receives the required approvals, it's still business as usual. After all, we're both still committed to providing you with the same levels of service capability and quality that you've been experiencing all along. So you should continue to deal with each company as you have in the past.

If you have any questions about our new or existing products and services, we'll both be exhibiting at this year's Interface Show in Atlanta in March. Stop by and we'll talk. With the steps we're taking to improve data communications, it'll be worth the walk.

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NEW PRODUCTS

Unilan net gets gateway to processors

Applitek Corp. of Wakefield, Mass., has added the N110/G to its Unilan network.

According to the vendor, the N110/G enables Applitek users to interface to CCITT X.25 networks and provides the ability to interface ASCII terminals to IBM, Sperry Corp., Honeywell, Inc., Burroughs Corp., NCR Corp. and Intel Corp. Multibus-based processors operating under Unix.

The N110/G is said to provide a Systems Network Architecture (SNA) gateway that enables ASCII terminals and printers to connect to IBM Synchronous Data Link Control (SDLC) mainframes. The terminals appear as IBM 3278 terminals connected to IBM 3274 or 3276 cluster controllers.

The SNA gateway supports up to 32 concurrent virtual circuits into the IBM host at speeds up to 64K bit/sec. The SDLC protocol is supported over switched and leased lines and on point-to-point or multidrop lines.

The X.25 gateway supports High Level Data Link Control and bit-oriented link access procedure links at speeds up to 64K bit/sec.

It can act as data circuit equipment or data terminal equipment, which enables it to interface terminals on a Unilan network with host computers on an X.25 network, to interface host computers on a Unilan network with terminals on an X.25 network, to allow terminals to interface with a host on the same Unilan network over a multiplexed X.25 link and to connect two Unilan networks over an X.25 link that will enable a terminal user on one network to establish a session with a device on the other network.

Other host gateways include IBM 3270 Binary Synchronous Communications, IBM 2780, NCR 270 International Standards Organization (ISO) asynchronous, Multibus ISO asynchronous, Burroughs Poll/Select, Honeywell support for VIP 7700 and Sperry support for Univac CPUs or UTS 20/30 terminals.

Prices for the N110/G start at $11,000, Applitek said.

Kit-Mas software transfers analysis results to data base

Structural Measurement Systems, Inc. of San Jose, Calif., and Kensinger Associates of Minneapolis have announced the Kit-Mas software program.

Kit-Mas is said to permit users of the Ansys Finite Element Analysis program from Swanson Analysis Systems, Inc. to transfer the results of an analytical modal analysis to the data base of the SMS Structural Analysis System (SAS) 3 from Structural Measurement Systems.

The Ansys program typically runs on large superminicomputers such as the Digital Equipment Corp. VAX, the Data General Corp. MV series, the Hewlett Packard Co. Series 500 or Prime Computer, Inc. systems.

SMS SAS runs on any of the Motorola, Inc. 68000-based HP 9000 Series 200 or 300 Technical Workstations.

According to the vendor, moving the Ansys results to the SAS 3 data base on the HP Series 200 or 300 allows users to compare experimental results with the analytical model, both visually via the real-time animated mode shape display in SAS and quantitatively via the Modal Assurance Criteria.

It is also possible to modify analytically the finite element model using the SMS Structural Dynamics Modification procedure.

This capability means that Ansys users can investigate mass, stiffness or damping changes to the finite element model without having to rerun the entire finite element model.

Kit-Mas costs $14,000.

Cobol 85 compiler features runtime library, debugger

A Cobol 85 compiler, ACT/Cobol 85, has been announced by Advanced Computer Techniques Corp. of New York.

ACT/Cobol 85 conforms to the recently approved Cobol 85 ANSI language standard. It features a runtime library and optional symbolic debugger. Both native and cross-compiler versions of the product will be available.

According to a spokesman, the compiler is written in Pascal, making it rehostable and retargetable to virtually any computer architecture.

The spokesman stated that a computer manufacturer could get on the Cobol 85 standard quickly using ACT/Cobol 85, saving the years of effort it would take to develop a Cobol 85 compiler.

The compiler will be available in the third quarter of 1986. License prices range from $50,000 to $100,000, plus royalties.

Votan offers PC telephone tool

Votan, Inc. of Fremont, Calif., has introduced a hardware/software package that is said to add comprehensive voice communications, continuous voice recognition and telephone management capabilities to IBM Personal Computers and compatibles.

Called the PC Executive Secretary, the system allows personal computers to accept voice commands from users. It was also designed to perform a variety of call management functions such as automatic answering, caller screening and identification, message recording and playback, remote message retrieval by voice command, voice memory broadcasting, telephone directory and automatic call logging and automatic dialing by voice command.

The system is also said to provide continuous speech recognition. The PC Executive Secretary costs $1,695 including voice board, telephone management software, telephone interface, speaker and microphone.

INSIDE

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SOFTWARE & SERVICES

Systems software

Virtual Microsystems, Inc. has announced a new release of its **Bridge/86 system** designed to give Digital Equipment Corp. and Data General Corp. systems access to personal computer software.

The new release adds IBM Personal Computer compatibility. With Bridge/86, users can now run IBM PC-DOS software from any terminal on their system.

The Bridge system is said to allow data to be stored on virtual disks and backed up automatically with the host. Users can share data with users of microcomputers and can switch between mini and microcomputer operating systems.

Prices start at $2,450.

Virtual Microsystems, Suite 300, 2150 Shattuck Ave., Berkeley, Calif. 94704.

■

Landmark Systems Corp. has announced that its **Monitor for CICS** now supports IBM's CICS Release 1.7 and Applied Data Research, Inc.'s Ideal fourth-generation language.

The Monitor for CICS is a CICS performance management system for on-line monitoring, problem determination and resolution, system and application debugging and tuning, data management and batch reporting of performance statistics for CICS.

It is available for a permanent site license fee of $17,500 for IBM's MVS, MVS/XA and VS1 systems and $8,000 for DOS/VSE.

Landmark Systems, 6564 Loisdale Court, Springfield, Va. 22150.

■

Uccel Express Software has announced **Release 2.1** of **Data Check Recovery**, its software product designed for recovering DASD data damaged by permanent I/O errors.

Release 2.1 is said to allow data processing centers that have VM minidisks attached to IBM MVS operating systems to use the product to detect and recover from DASD errors. Another improvement is the erase feature.

Data Check Recovery Release 2.1 supports all releases of MVS, the vendor said.

A site license costs $9,900.

Uccell Express Software, P.O. Box 1109, 360 Herndon Pkwy., Herndon, Va. 22070.

■

Spectrum Concepts, Inc. has announced **Spacecalc**, an on-line software package for DASD resources and VSAM file structures.

Spacecalc is said to allow an installation to make the best use of DASD resources and to model complete efficient VSAM file structures without running IDCAMS.

Spacecalc calculates DASD file requirements so that space can be allocated dynamically directly from Spacecalc, according to Spectrum Concepts.

Spacecalc runs in a TSO/ISPF environment.

It is priced at $6,700 per CPU.

Spectrum Concepts, 150 Broadway, New York, N.Y. 10038.

Applications packages

Marcam Data Systems Corp. has introduced **Prism**, production management and planning software for process and repetitive manufacturers.

Prism runs on the IBM System/38. According to the vendor, it enables users to manage material, labor grades, utilities and other cost and resource elements of production.

The system consists of integrated modules: the foundation module, resource management, resource processor, resource planning, costing, order processing, purchasing and accounting.

The first three modules, making up the basic system, cost $66,000. Additional modules cost $22,000 each.

Marcam, 19 Crawford St., Needham, Mass. 02192.

■

RTC Systems, Inc. has announced **Release 6** of its **Manufacturing Resource Planning** business system for the IBM System/38.

Release 6 supports a bucketless system with an unlimited forecast/schedule horizon as well as new simulation capabilities.

Management information inquiries and reports include resource capacity, projections for inventory and revenue/expense and comparisons of forecasts vs. sales plans, the vendor said.

Prices range from $10,000 to $35,000.

RTC Systems, 603 West St., Mansfield, Mass. 02408.

■

Mechanical Dynamics, Inc. has announced that its **Adams** software is available for the 32-bit IBM RT Personal Computer engineering workstation.

Adams is said to determine displacements and reaction forces of rigid body and elastic mechanisms under real-world operating conditions, including the application of large forces that drive the analysis well into the nonlinear domain and have discontinuous effects. Solutions are provided in an interactive time frame so a variety of design iterations can be analyzed.

Adams for the RT PC costs $36,000 or $1,000/mo.

Mechanical Dynamics, 3055 Plymouth Road, Ann Arbor, Mich. 48104.

Tired of running cables to add terminals?

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Equinox Local Multiplexers pass data up to 9600 bps with control signals. And because they're fully transparent to all data, they work with virtually any async terminal, printer or computer. Easy to install, Equinox Local Multiplexers send data up to one mile.

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NEW PRODUCTS/SOFTWARE & SERVICES

MCBA, Inc. has announced its **Job Costing** software package for Wang Laboratories, Inc. VS minicomputers.

The package is said to be able to estimate future job costs; allow each job to track optionally either actual costs or standard costs; support multiple shop orders; display up-to-date job status information; create general ledger entries; identify areas of excessive variance from estimates; divide material cost variances into price/substitute, yield and quantity; and divide labor cost variances into labor rate, performance and quantity.

Job Costing is priced from $4,000 to $7,500.

MCBA, 425 W. Broadway, Glendale, Calif. 91204.

Languages

Cognos Corp. has announced **Version 4.04** of its **Powerhouse** fourth-generation software language for systems operating under Digital Equipment Corp. VMS.

The version features an on-line Help library member that works within the existing on-line VMS Help system, support for a new data-type and system function that returns the VMS system date, partial segmented key support and several new program parameters and statements, including one that accomplishes the conversion of Ph.D. file definitions to DEC VAX Common Data Dictionary definitions.

Prices for Powerhouse range from $7,500 to $55,000.

Cognos, 2 Corporate Place, Peabody, Mass. 01960.

Utilities

C. A. Electronics, Inc. has announced **Catalogue**, a software utility for interfacing and cataloging file management activities.

Catalogue is said to present a list of all files on the screen sorted alphabetically by file size or by modification date and time. It features functions such as copy, dump, rename, delete and type.

Catalogue reportedly runs on Burroughs Corp.'s CTOS-based systems and Convergent Technologies, Inc.'s BTOS- based systems and is said to be supported by all Convergent Technologies workstations and Megaframes.

Catalogue costs $189.

C. A. Electronics, 640 Lancaster Ave., Frazer, Pa. 19355.

■

Vertical Systems, Inc. has announced its **VSI/DMAS Serial Number Lot Tracking** system said to enhance IBM's Distributors Management Accounting System (DMAS) II distribution software package.

The serial number/lot tracking system allows users to code up to a 25-digit alphanumeric serial or lot number. Records are maintained at all stages on the origin and status of numbered goods. Items or lots can be put on temporary hold. Balancing controls ensure that serial/lot data is present for all required items. Files are updated with destination information. Standard DMAS functions are supported.

The system runs on an IBM System/36.

An object code license costs $2,500, and a source code license costs $3,000.

Vertical Systems, Suite 206, 909 Northeast Forty-Third, Seattle, Wash. 98105.

■

Digital Equipment Corp. has announced **Xway**, a software package designed to exchange spreadsheet models and data between personal computers and DEC VAX computers.

Xway enables users to exchange information bidirectionally between spreadsheet programs such as Lotus Development Corp.'s 1-2-3 and Visicalc, Microsoft Corp.'s Multiplan and Decalc.

Xway is also said to let personal computer users share information among other applications and data bases.

Xway is licensed at $300 for the Vaxstation I, $1,800 for the Microvax II and $3,000 for the other VAX systems.

DEC, Maynard, Mass. 01754.

■

Netron, Inc. has enhanced its **Netron General Purpose Editor**, an interactive file editor said to be able to edit both program and data files.

This release doubles the file capacity of previous versions to 32,766 records. Users are warned when approaching the limit.

Another change reportedly allows users to open and edit files in shared mode, allowing the examination of production files or testing new programs on copies of files also needed by others.

The General Purpose Editor runs on Wang Laboratories, Inc. VS minicomputers, according to Netron.

It costs $3,500.

Netron, 99 St. Regis Crescent N., Downsview, Ont., Canada M3J 1Y9.

Services

Whitesmiths, Ltd. has announced **All Hands-On C Video Workshop**, a videotaped introduction to the C language.

The course covers the C language up through the basics of pointers and structures and is geared toward users with some programming experience in Pascal or Fortran, according to Whitesmiths.

The workshop is five hours long and includes a workbook, a textbook and diskettes for machine-readable examples.

The All Hands-On C Video Workshop costs $1,000.

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Whitesmiths, 97 Lowell Road, Concord, Mass. 01742.

■

The Paradigm Group has enhanced its **Paradigm Procedures** documentation supplement designed to simplify and improve use of the Ask Computer Systems, Inc. Manman System.

The procedures have been updated to the latest Ask release, and repetitive manufacturing support and a new customer service section have been added, according to company spokesmen.

Each procedure set is said to include a statement of operating policies, references to pertinent Ask commands, reports, documents and related procedures, identification of responsible individuals and detailed tasks plus copies of relevant business forms.

The set costs $7,950.

Paradigm, 4 Whitney Court, Menlo Park, Calif. 94025.

MICROCOMPUTERS

Systems

Valid Logic Systems, Inc. has announced the **Validation Designer AT**, a computer-aided engineering (CAE) system.

The system is based on a standard IBM Personal Computer AT enhanced with an 85M-byte hard disk, optical mouse, 32-bit coprocessor with 2M bytes of random-access memory and AT&T Unix System V. The user can toggle between Unix and IBM PC-DOS to mix CAE tasks with personal computer applications.

The system is available with one of three graphics display options.

The AT/GX includes the IBM GX 19-in. color display with 1,024- by 1,024-pixel resolution. It costs $36,950.

The EG system includes the IBM Enhanced Color Display and Adapter 13-in. color display with 640- by 350-pixel resolution. It costs $27,950.

The VG system includes Valid's VG 15-in. color display with 1,024- by 800-pixel resolution. It costs $29,950.

Valid Logic Systems, 2820 Orchard Pkwy., San Jose, Calif. 95134.

■

Bondwell has announced the **Bondwell 8**, a lap-size IBM-compatible portable computer.

It features 512K bytes of on-board random-access memory, a built-in 3½-in. floppy disk drive, 300 bit/sec. modem, 80-col. by 25-line backlit LCD display, 640- by 200-pixel graphics display, rechargeable battery, real-time clock, red-green-blue and composite color video outputs, RS-232C serial port, Centronics Data Computer Corp.-type printer port, second disk drive, Microsoft Corp. MS-DOS 2.11 and Convergent Technologies, Inc.'s GW Basic 2.

The Bondwell 8 costs $1,595.

Bondwell, #10, 3300 Seldon Court, Fremont, Calif. 94539.

Software applications packages

Raster Technology, Inc. has introduced the **Starter** series, the **Intermediate** series and the **Expert** series of its Trainer Turned Author and Teacher Turned Author courseware authoring systems for the IBM Personal Computer.

These authoring systems are said to allow users to create interactive tutorials or training courses on any subject matter. Text, graphics and questions may be mixed on any page.

The Starter series is priced at $119. The Intermediate series costs $299, and the Expert series costs $485.

Raster Technology, P.O. Box 3477, 283 Hunter's Point, Longwood, Fla. 32779.

■

Sapana Micro Software has announced **Mail-Track-II with Lettermerge II**, a mailing list management package for IBM Personal Computers.

The program's features include the ability to handle U.S., Canadian and foreign addresses; 24 user-defined fields; 24 or more on/off flags to classify addresses; the ability to handle up to 32,766 address in a file; the ability to watch for duplicate entries; the ability to sort on multiple fields; personalized form letters; 20 user-defined print formats; merge and split mailing lists; and import and export comma delimited pure ASCII files.

The software costs $95.

Sapana, 1305 S. Rouse, Pittsburg, Kan. 66762.

■

Brightbill-Roberts and Co. has announced **Show Partner**, a graphics software package designed for personal computers.

The software is said to feature animation capabilities and a slide show manager. It loads into random-access memory. It can capture and edit text or graphics screens from any source and save them as named files. It can add colors; size, rotate and move graphics; and add text to graphics. Other features include a font editor, a grid template and the ability to replace, wipe, split and box.

Show Partner is priced at $149.

Brightbill-Roberts, Suite 421, 120 E. Washington, Syracuse, N.Y. 13202.

■

Envoy Systems Corp. has added **Salesorder**, an order entry tool for field sales representatives, to its Salesmate family of integrated modular sales application software for IBM-compatible portable computers.

Continued on page 108

MAY THE BEST PRICE WIN...

IS-687
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IT'S NO CONTEST!

The **IS-687 Printer** is plug-in compatible and interchangeable with the IBM 3287 Printer, Models 2, 3, 4 and 5. It can be used with S/370, 43XX and 30XX Processors or compatible systems.

The IS-687 connects directly via coaxial cable to the IBM 3274 (Local/Remote) and 3276 control units, to the 4300-series Processors and to the IS-674 Communication Controller.

The IS-687 is a low-noise, heavy duty matrix printer, in an attractive tabletop design. It operates at a speed of 200 cps in data processing mode, and **provides an option for near-letter quality printing at 50 cps.** It fully supports BSC and SDLC/SNA communication protocols. Advanced self-test and diagnostic procedures achieve high standards of reliability and seviceability.

The IS-687 is a straightforward replacement of IBM 3287 printers, while achieving better printing performance at substantial cost savings.

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"When trying to reach VAX users, Computerworld gets results."

R. Stephen Lilly
Director of Marketing
Computer Information Systems
Braintree, MA

Steve Lilly, Director of Marketing for Computer Information Systems (CIS), had set a clear enough goal: he wanted to introduce CIS' system management software, Quantum RS, to the marketplace and explain how it is used for VAX resource tracking, capacity planning and resource/cost allocation.

Steve delivered his message in Computerworld as well as in other trade publications. He quickly discovered that Computerworld does, indeed, get results. *"Computerworld has helped CIS reach its target audience — the decision-making systems managers who are current and future users of VAX systems,"* he says. *"Basically, Computerworld readers are serious buyers; if they inquire about a product, they're a viable lead — and often a sale."*

Steve is sure about this because CIS tracks its leads with an in-house marketing system.

"We've found that Quantum RS generates a tremendous amount of interest, but CIS' sales department is dependent on the quality — not quantity — of responses. And we know Computerworld delivers quality — which added to Quantum RS' sales increase of 218 percent last year," Steve says.

One reason CIS has relied on Computerworld over the last two years is Computerworld's diverse coverage. *"Computerworld covers the industry. Today's corporate DP shop is more of a mixed-vendor environment than it was in the past. In growing numbers, corporate users are utilizing IBM PCs and ATs for microcomputing and DEC VAX systems for departmental and mainframe computing,"* notes Steve. *"Based on this, we've found Computerworld to be a very effective vehicle to reach VAX users, especially in large DP environments."*

Computerworld. We're helping more suppliers reach more buyers more often in the computer market. We cover the entire computer world. Every week. We deliver the news, the analysis, and the audience. Just ask Steve.

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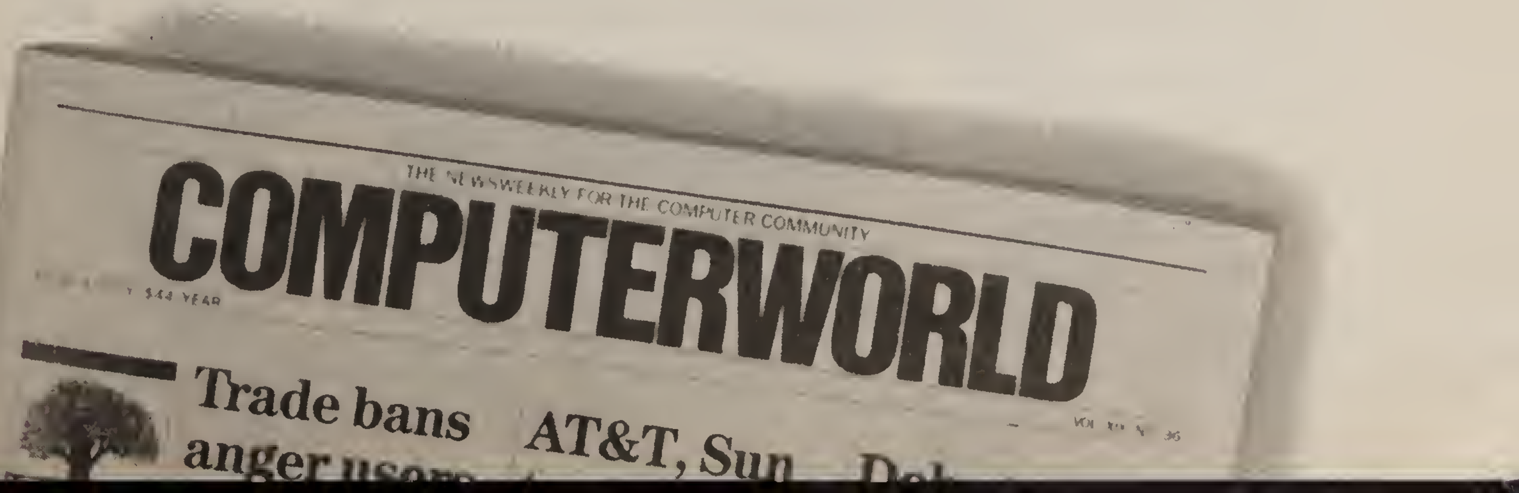

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 106

Salesorder is said to provide sales representatives with a method of sales order entry. It includes fill-in-the-blank order forms and accommodates product/price tables. It offers an enhanced spreadsheet capability and provides order analysis reports.

Salesorder is priced at $480. It requires the Salesmate system software, which costs $1,150. Other Salesmate modules cost from $300 to $700 each.

Envoy Systems, 1432 Main St., Waltham, Mass. 02154.

■

EOS Corp. has introduced **MVP**, a graphics presentation program for the IBM Personal Computer.

MVP reportedly provides four to 64 colors. It is menu driven and includes a Capture utility said to import displays generated by any graphics program. MVP also has a Roadshow option which produces self-running electronic slide shows for operation on any compatible graphics personal computer without the need for the MVP core program.

Currently, 16 patterns for filled shapes and painting and eight fonts are furnished.

MVP costs $195.

EOS, 8204 Brentwood Industrial Drive, St. Louis, Mo. 63144.

■

Marathon Systems has announced **Polydraw**, a program for the IBM Personal Computer and compatibles, which is said to compute and plot three-dimensional functions in perspective.

The program features two modules: Polyfit for generating polynomial coefficients from raw data and plotting the resultant function with the data points; and Polyplot for computing and plotting a 3-D function from the polynomial coefficients.

Polydraw requires IBM PC-DOS 2 or higher, a graphics monitor, 128K bytes of memory and a single disk drive. It costs $125.

Marathon Systems, Suite 165, 478 W. Hamilton Ave., Campbell, Calif. 95008.

■

Computer Concepts has announced **Real-Tools**, a software development tool kit package.

According to the vendor, Real-Tools is a set of C function libraries and Unix productivity tools. It consists of screen management; virtual windows; a device-independent terminal interface; status line management; labeled soft keys and menus; a data base interface; an operating system interface; interprocess communications; string, math and time functions; and an automated programmer productivity system utilizing the Unix Make facility.

Real-Tools requires an IBM Personal Computer XT or AT running Microsoft Corp. Xenix 3.

Real-Tools costs $1,995 per CPU for a limited source code license, $495 for a binary code license and $4,995 plus $95 per copy for embedded binary distribution.

Computer Concepts, 2323 Edgedale Drive, Missouri City, Texas 77489.

Software utilities

Applied Information Systems, Inc. has announced **PC Easyentry**, a full screen data entry applications generator for the IBM Personal Computer and the Digital Equipment Corp. Rainbow.

According to the vendor, Easyentry allows personal computers running Microsoft Corp.'s MS-DOS or IBM's PC-DOS to be used as key-to-disk data entry stations. Easyentry provides field validation features including range tests, validity checks, internal and file table lookup, selective and full rekey verification, batch totals and error messages.

Easyentry costs $500.

Applied Information Systems, Suite 207, 500 Eastowne Drive, Chapel Hill, N.C. 27514.

■

Fort's Software has announced the **Virtual Expanded Memory Manager** (V-EMM).

The package is said to provide virtual memory capability for programs that support the Lotus/Intel/Microsoft Expanded Memory Specification (EMS). Minimum system requirements are an IBM Personal Computer or Personal Computer XT, IBM PC-DOS, 128K bytes of conventional memory, any EMS-compatible board, 256K bytes of expanded memory and an IBM fixed disk drive and fixed disk adapter.

V-EMM is priced at $89.95.

Fort's Software, P.O. Box 396, Manhattan, Kan. 66502.

■

Alpha Merics, Inc. has announced **Typer**, a software utility designed to allow an IBM Personal Computer to act as a fully functioning memory typewriter.

Typer allows users to type memos, single envelopes, labels, individual forms and Rolodex brand file cards.

According to the vendor, Typer is compatible with virtually every printer.

Typer is priced at $79.95.

Alpha Merics, 1623 S. 21st Ave., Hollywood, Fla. 33020.

■

Jorj Software Co. has announced **Jorj**, an English dictionary designed for use on the IBM Personal Computer.

Jorj is said to be capable of searching for words that are spelled pho-

Continued on page 110

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IBM API (Low Level)	Yes	Yes
IBM Personal Services/PC	Yes	Yes
DOS Runs In Background	Yes	Yes
Available In PC, XT & AT	Yes	Yes
Host Printer Session	Yes	No
IRMA™ Emulation	Yes	No
Available in Non-IBM PCs	Yes	No
Upgrades For Existing PCs	Yes	No
Internal Tape Back-up Available	Yes	No
Fundamentals Training Course	Yes	No
Memory Required (4 Sessions)	120K	267K
Slots Available (3270 PC, APA)	4	2

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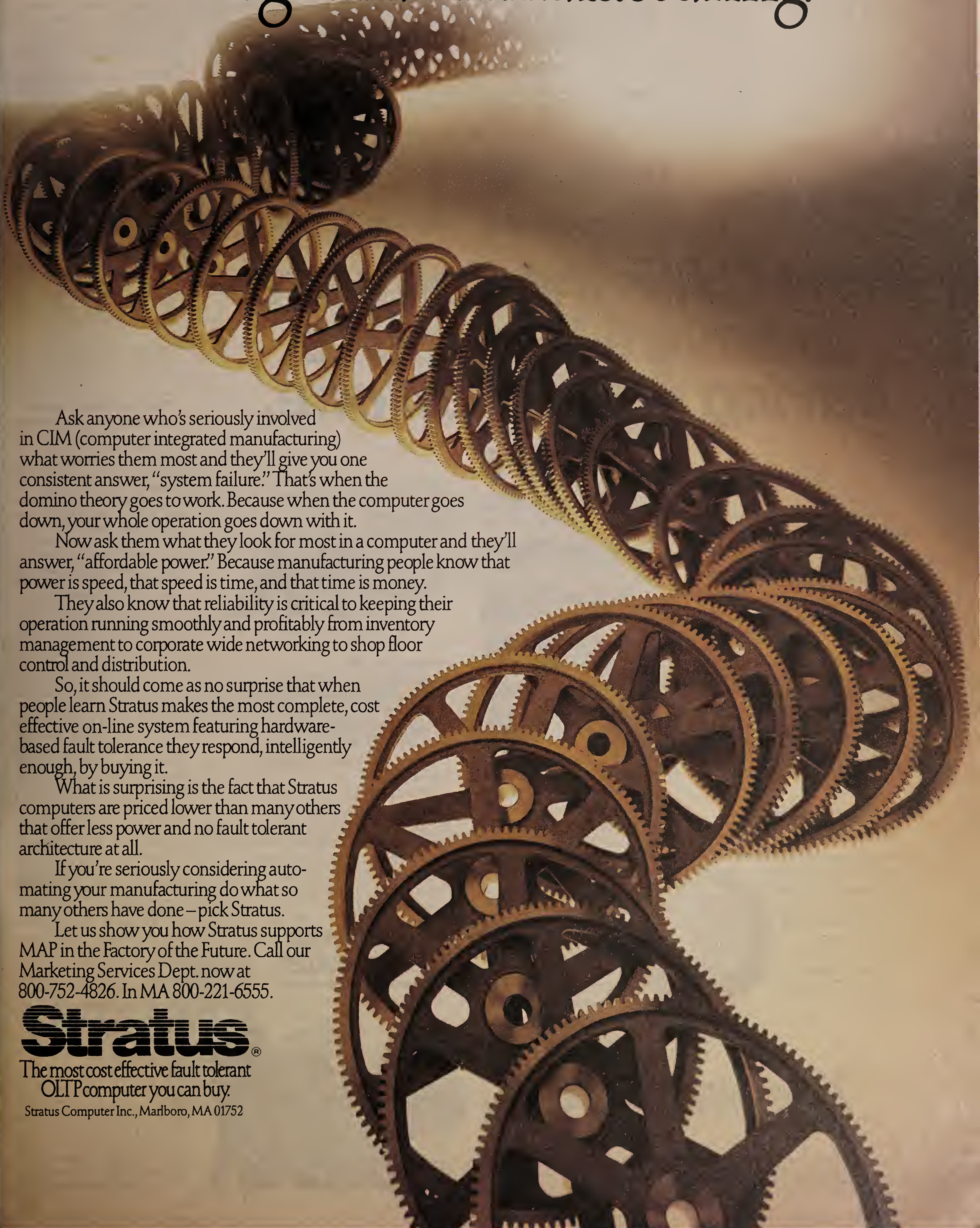

The case for fault tolerant computer integrated manufacturing.

Ask anyone who's seriously involved in CIM (computer integrated manufacturing) what worries them most and they'll give you one consistent answer, "system failure." That's when the domino theory goes to work. Because when the computer goes down, your whole operation goes down with it.

Now ask them what they look for most in a computer and they'll answer, "affordable power." Because manufacturing people know that power is speed, that speed is time, and that time is money.

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So, it should come as no surprise that when people learn Stratus makes the most complete, cost effective on-line system featuring hardware-based fault tolerance they respond, intelligently enough, by buying it.

What is surprising is the fact that Stratus computers are priced lower than many others that offer less power and no fault tolerant architecture at all.

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Let us show you how Stratus supports MAP in the Factory of the Future. Call our Marketing Services Dept. now at 800-752-4826. In MA 800-221-6555.

Stratus®

The most cost effective fault tolerant
OLTP computer you can buy.

Stratus Computer Inc., Marlboro, MA 01752

Continued from page 108

netically. The program uses a data base containing over 50,000 words and 15,000 definitions. When the word is found, it is displayed along with the root word, definitions and all common inflected forms.

It requires a hard disk drive and 64K bytes of random-access memory.

Jorj is priced at $100.

Jorj Software, 4354 Fletcher Road, Manchester, Mich. 48158.

Proto Systems has announced the **D-M-Driver** disk emulation software for Digital Equipment Corp. Pro 300 series computers using the DEC P/OS operating system.

The package is said to allow use of a portion of memory as a disk substitute. The size of the disk is limited only by the available physical memory allocated. The maximum disk size is about 768K bytes on the Pro 350 and 1,792K bytes on the Pro 380.

A single end-user binary license, documentation and RX50 media is priced at $295.

Proto Systems, 1238 Josephine St., Berkeley, Calif. 94703.

■

United States Software Corp. has announced the **USXZ80**, a real-time, multitasking software product for Zilog, Inc. Z80 microprocessors.

The software is a read-only memory product featuring dynamic task, time, resource, message and event management. Modular product organization enables user-configurable implementation of up to 254 tasks, 255 resources, 255 events and 255 mailboxes. It also allows time delay scheduling of events.

The product comes with documentation and a sample debug test program. It is delivered in source assembly. It costs $1,950.

United States Software, 5470 N.W. Innisbrook Place, Portland, Ore. 97229.

■

Lambid Development, Inc. has announced **Mr. Blue**, a utility product for IBM Personal Computers, PC XTs and ATs.

Mr. Blue is said to feature a full screen display window as an alternative to the single-direction, single-line scrolling and line wrapping characteristics of IBM PC-DOS.

The display window measures 23 lines by 256 positions. It can be shifted to any position in the file.

Mr. Blue can search for character strings. File names from the current directory or subdirectories can be displayed.

Disk drives can be changed at any time, and there is no limit on input file sizes.

Mr. Blue costs $45.

Lambid Development, P.O. Box 3290, Skokie, Ill. 60076.

Software data base management systems

Pictureware, Inc. has announced **Picturepower**, a software product for IBM Personal Computers said to allow users to incorporate photographic-quality pictures in data bases.

Picturepower contains a data base manager, picture capture facility, picture editor, forms generator and data communications system.

Users can capture, store, edit and transmit data bases including photographs without any other software, according to the vendor.

Picturepower is said to be compatible with Ashton-Tate's Dbase II.

Pictures can reportedly be entered via video camera, video or compact disk, videocassette recorder or transmission from another computer.

Picturepower is priced at $795.

Pictureware, 111 N. Presidential Blvd., Bala Cynwyd, Pa. 19004.

Software enhancements

Radford Associates, Inc. has enhanced its **First Resource** software for human resource professionals.

Version 1.2 has been expanded to include a basic skills inventory, automatic change of status, an enhanced report writer, employee annual benefits statement and an audit trail for increased security.

The version also permits users to consolidate data from remote sites into a single copy of First Resource for reporting purposes.

First Resource runs on the IBM Personal Computer, PC XT or compatible using a

Continued on page 112

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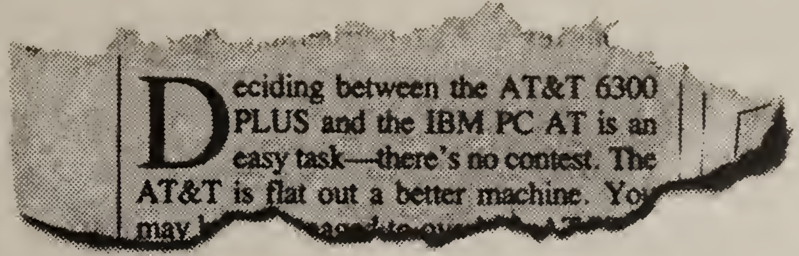
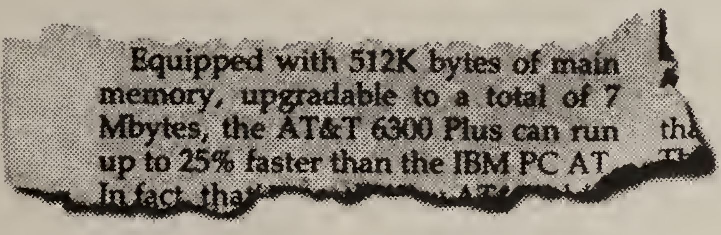


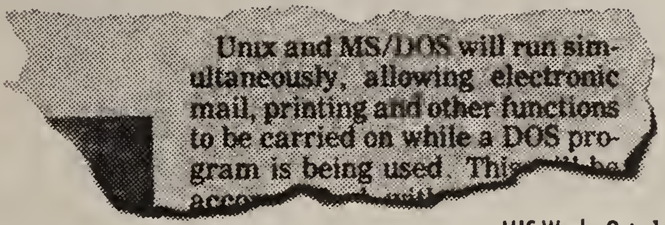
Deciding between the AT&T 6300 PLUS and the IBM PC AT is an easy task—there's no contest. The AT&T is flat out a better machine. Yo

—— PC Magazine, Feb. 25, 1986*



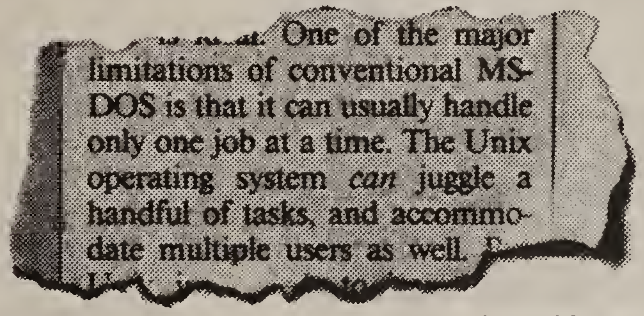
Equipped with 512K bytes of main memory, upgradable to a total of 7 Mbytes, the AT&T 6300 Plus can run up to 25% faster than the IBM PC AT. In fact, tha

—— Information Week, Oct. 14, 1985



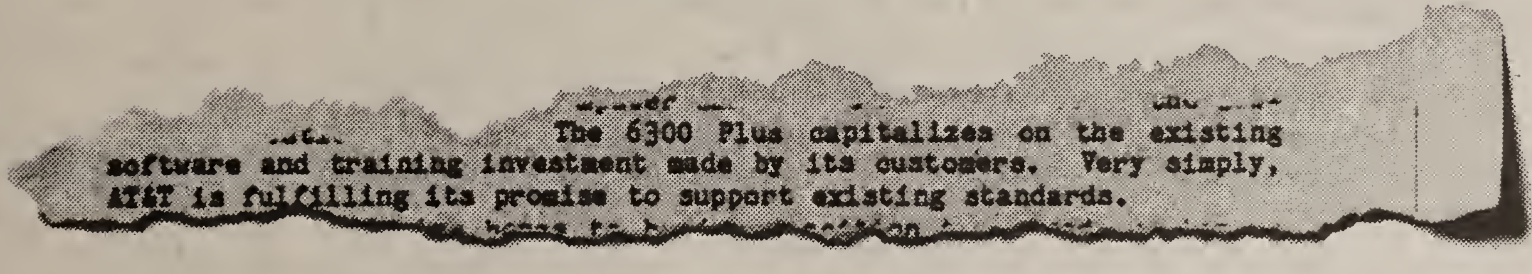
Unix and MS/DOS will run simultaneously, allowing electronic mail, printing and other functions to be carried on while a DOS program is being used. This

—— MIS Week, Oct. 16, 1985



One of the major limitations of conventional MS-DOS is that it can usually handle only one job at a time. The Unix operating system *can* juggle a handful of tasks, and accommodate multiple users as well.

—— Personal Computing, Dec. 1985



The 6300 Plus capitalizes on the existing software and training investment made by its customers. Very simply, AT&T is fulfilling its promise to support existing standards.

—— Yates Venture, Oct. 1985

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The AT&T PC 6300 PLUS is not only getting favorable reviews, *PC Week* went as far as calling it "...one of The Most Significant Products of 1985."**

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Continued from page 110

10M-byte hard disk.

Prices start at $6,750.

Radford Associates, Suite 400, 4800 Great America Pkwy., Santa Clara, Calif. 95054.

■

Decisionware, Inc. has released **Version 2** of **Rightwriter**, an intelligent grammar and style checker for the IBM Personal Computer.

Rightwriter is said to use artificial intelligence to analyze documents for errors in grammar, usage, punctuation and style. Rightwriter 2 uses more than 2,200 rules and a 45,000 word dictionary.

In addition to inserting recommendations into the document text, Rightwriter adds an overall critique to the end of the document, including the document's reading level, the strength of delivery and an analysis of sentence structure.

Rightwriter 2 costs $95.

Decisionware, Suite 218, 2033 Wood St., Sarasota, Fla. 33577.

■

Novell, Inc. has announced **Advanced Netware 2**, an enhanced version of its operating system software.

The version includes Microsoft Corp. MS-DOS 3.1 compatibility, enhanced user utilities, a Netware tutorial, an automatic spool feature, internal and external bridging capabilities and generic operating system software, among other features.

Advanced Netware costs $1,695. Advanced Netware 86 costs $1,595. Netware Bridge Software costs $395.

Novell, 748 N. 1340 West, Orem, Utah 84057.

■

Issco has announced **Version 3** of **PC Linkagraf**, said to add support for Digital Communications Associates, Inc.'s Irma adapter boards.

PC Linkagraf software allows IBM Personal Computer, PC XT and AT and compatibles to emulate graphics terminals for entering commands and obtaining output with Issco software residing on a host computer.

PC Linkagraf costs $500.

Issco, 10505 Sorrento Valley Road, San Diego, Calif. 92121.

■

Softbridge Microsystems Corp. released **Version 2** of the **Softbridge Financial Planner**, a personal financial planning software package for microcomputers.

The system is said to integrate Lotus Development Corp.'s 1-2-3; Multimate Software Systems, Inc.'s Multimate word processing package; and the Relational Database Systems, Inc. Informix data base.

The Financial Planner costs $6,000. Bundled with a Compaq Computer Corp. Compaq 286, it costs $11,450.

Softbridge Microsystems, 125 Cambridge Park Drive, Cambridge, Mass. 02140.

■

Computer Training Services has released an enhanced version of **The Requirements Analyst**.

The Requirements Analyst is said to take the user through a structured needs analysis of business operations to match needs with various accounting systems.

The release includes updated versions of Great Plains Software Co.'s Great Plains, Open Systems, Inc.'s Open Systems and BPI Systems, Inc.'s BPI. It also adds two more accounting systems: Excalibur Plus from Armor Systems and Macola from Macola, Inc.

The Requirements Analyst runs on IBM Personal Computers and compatibles running Lotus Develoment Corp.'s 1-2-3. It costs $280.

Computer Training Services, 5900 Tudor Lane, Rockville, Md. 20852.

Communications

PCC/Systems has introduced **CC:Mail for LANs**, an electronic mail system for users of local-area networks that support the IBM Personal Computer and compatibles.

The system allows users to send, receive, store and edit electronic message envelopes — including text, graphics, data files and display screens — from other software application programs. According to the vendor, envelopes can be sent from PC to PC on the network, to remote micros or to other remote networks, regardless of manufacturer.

The 10-user starter system costs $995. Expansion kits are available.

PCC/Systems, Suite 201, 480 California Ave., Palo Alto, Calif. 94306.

■

Valid Logic Systems, Inc. has announced **Networked Realchip**, said to provide designers who are validating electronic designs with concurrent, multiuser access to models of very large-scale integration (VLSI) devices.

Network Realchip consists of Realchip hardware, a network server processor and an Ethernet interface. Once installed, it serves as a library of VLSI models that may be accessed by any workstation concurrently.

The basic configuration, which can accommodate two VLSI devices, costs $49,500. It can be expanded up to 64 VLSI devices.

Valid Logic Systems, 2820 Orchard Pkwy., San Jose, Calif. 95134.

■

Connect Tech, Inc. has announced the **EMU 7700/7800** family of micro-to-mainframe products, said to enable an IBM Personal Computer, Per-

Continued on page 116

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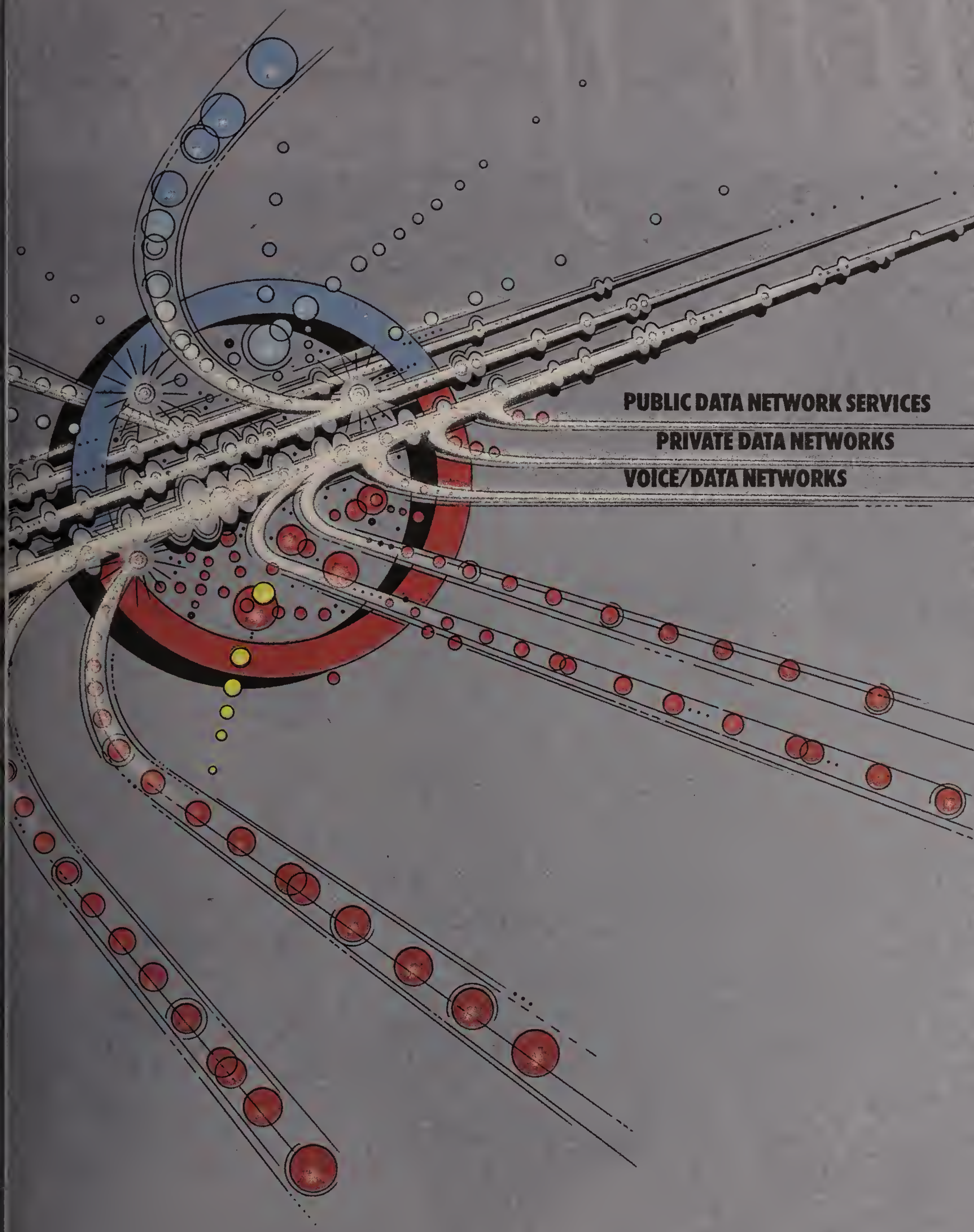

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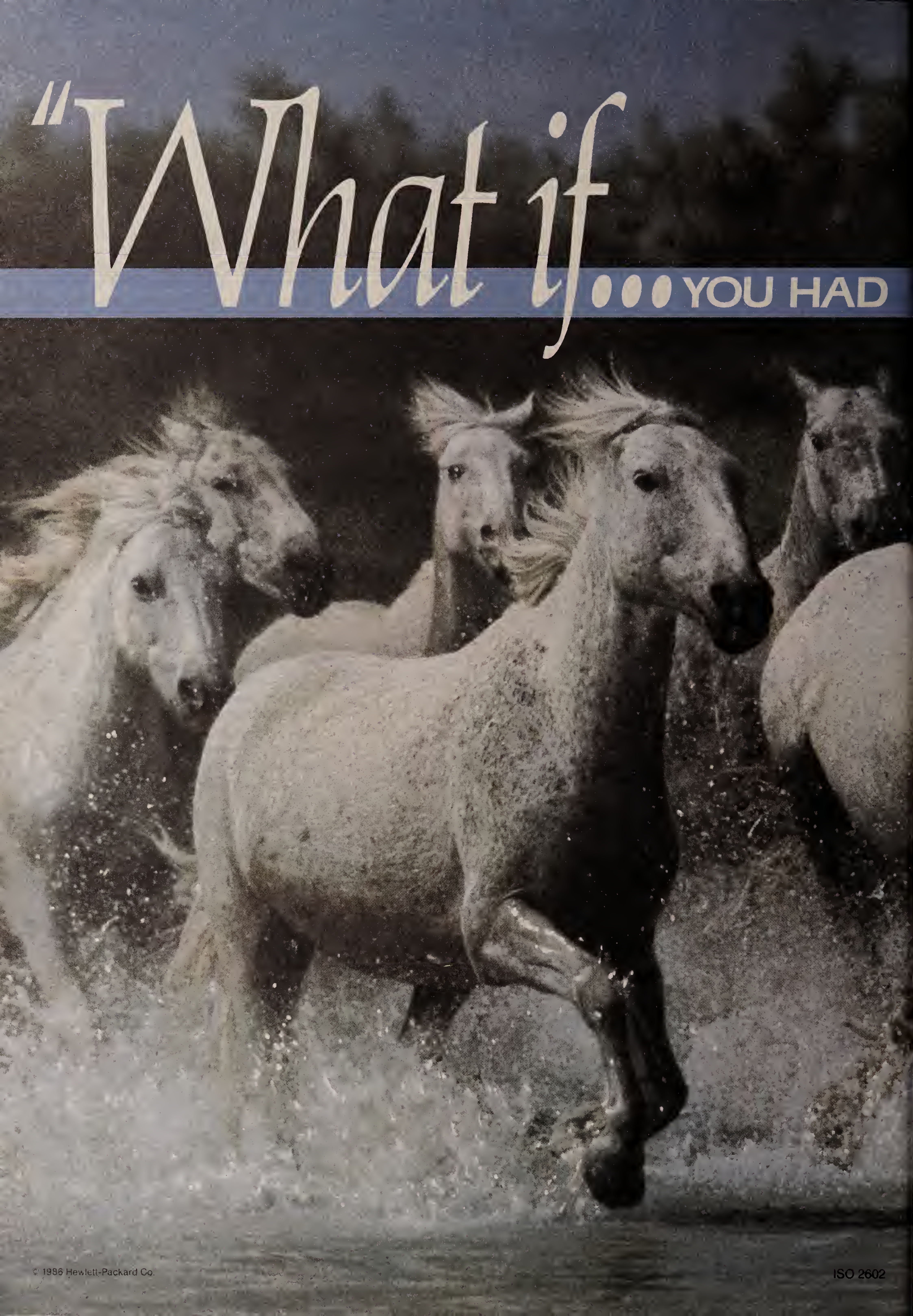

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Continued from page 112

sonal Computer XT and AT or compatibles to communicate with a Honeywell, Inc. DPS 4, DPS 6, DPS 7, DPS 8, Level 62, 64 or 66 host.

These hardware/software packages feature Honeywell VIP 7700, 7804 and 7814 terminal emulation; full buffered printer emulation; and bidirectional host-controlled file transfer.

An EMU read-only printer option is said to allow IBM PC-compatible printers to communicate with the Honeywell host.

The EMU 7700/7800 costs $639. The read-only printer option costs $149.

Connect Tech, #20 340 Woodlawn Road W., Guelph, Ont., Canada, N1H 7K6.

■

The Destek Group has announcd **Desnet**, a local-area network that includes Destek's 2M bit/sec. board-level hardware and software compatible with Digital Research, Inc.'s Concurrent CP/M 86.

According to the vendor, Desnet is available for systems based on IEEE S-100, IBM Personal Computer and Intel Corp. Multibus hardware. It allows limited-resource computers to access high-performance systems such as large file servers or special-purpose printers.

Desnet costs approximately $600 per node.

The Destek Group, 830 E. Evelyn Ave., Sunnyvale, Calif. 94086.

Data storage

Hymco Technologies, Inc. announced the **PEX-100** IBM Personal Computer XT expansion unit.

The unit comes with fliptop case, 135W power supply, eight expansion slots, two front openings for drives and short interface adapters with a fully shielded cable.

PC users can add a hard disk drive, a floppy disk drive, a tape drive and plug-in cards.

The PEX-100 costs $645.

Hymco Technologies, 5320-D Monterey Road, San Jose, Calif. 95111.

■

U.S. Lynx has added the **HD 3000** model to its Intermedia disk and data conversion system.

The HD 3000 is said to give the user everything needed to read more than 500 disk formats and write more than 300 disk formats. It transfers data between incompatible computer systems by disk, telecommunications, going on-line and magnetic tape.

The HD 3000 package includes two 5¼-in. drives, an 8-in. drive and a 3½-in. drive as well as the Intermedia Graphics Output option; a multifunction board; and a 20M-byte hard disk.

The HD 3000 model costs $20,950.

U.S. Lynx, 853 Broadway, New York, N.Y. 10003.

■

Advanced Digital Information Corp. has announced the **TD440**, a 40M-byte tape drive for the IBM Personal Computer.

The TD440 uses a 3M Corp. DC2000 ¼-in. mini tape cartridge. It is said to emulate a hard disk drive. It is file addressable and responds to Microsoft Corp. MS-DOS 2 and 3 commands. Programs can run from tape and data can be stored to tape directly from an applications program.

The TD440 costs $1,490.

Advanced Digital Information, P.O. Box 2996, 10201 Willows Road, Redmond, Wash. 98073.

■

Micro Design International, Inc. has announced the **MT40P 40 MEG** portable floppy tape system.

The 40M-byte tape system was designed around a 3½-in. tape drive. It connects to the external floppy port on IBM Personal Computers. According to the vendor, it uses a DC-2000 tape cartridge from 3M Corp. It supports a full-image or file-by-file backup and restore. It is available in internal units for the IBM Personal Computer, Personal Computer XT and AT and compatibles.

The MT40P 40 MEG costs $695.

Micro Design International, 6566 University Blvd., Winter Park, Fla. 32792.

■

Computer Dynamics, Inc. has announced its **Dynamic Card Drive** hard drive on a card for personal computers.

Continued on page 118

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1525 McCarthy Blvd./Milpitas, CA 95035

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In May's Computerworld Focus, we deliver that market to you with an issue devoted to solving some of the most pressing office automation issues.

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Continued from page 116

The card drive comes in 10M-byte and 20M-byte versions. According to the vendor, it requires no separate power supply, no power cables and no adapter. It installs in a personal computer expansion slot. It is said to boot directly from the hard disk.

The 10M-byte card drive costs $595. The 20M-byte card drive costs $649.

Computer Dynamics, Suite 361, 2201 Donley, Austin, Texas 78758.

Printers/Plotters/Peripherals

Tecmar, Inc. has announced that the **Q6OH**, the **Maestro**, the **Megafunction**, the **640 Plus**, the **5251/11 Emulator**, the **Phonegate 2400** and the **Escan** peripheral products are compatible with the Compaq Computer Corp. Portable II Personal Computer.

The Q6OH is a streaming-tape backup unit that can be shared by five units. The Maestro is a multifunction board. The Megafunction is an add-on board with multifunction and random-access memory disk capabilities. The 640 Plus is a memory board. The 5251/11 Emulator allows communciation with IBM System/34, 36 and 38 computers. The Phonegate 2400 is a 2,400 bit/sec. internal modem, and the Escan is a scanning image digitizer.

Prices are $2,144, $529, $895, $995 or $1,395, $795, $695 and $2,495, respectively.

Tecmar, 6225 Cochran Road, Solon, Ohio 44139.

Board-level devices

The **Emulex Corp. Persyst Division** has announced the **Bob/MG** monochrome graphics board for the IBM Personal Computer and compatibles.

The board is said to allow users to produce monochrome text and graphics on a standard IBM monochrome monitor and IBM-compatible color graphics on an IBM color monitor.

The board features a standard IBM-compatible parallel printer port and an IBM-compatible light pen port.

The Bob/MG costs $249.

Emulex Persyst, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

■

Orchid Technology Co. has introduced the **Tinyturbo 286** and the **PCturbo 286E**, two Intel Corp. 80286-based accelerator cards for the IBM Personal Computer, Personal Computer XT, AT and compatibles.

The PCturbo 286E fits into a single long slot. The Tinyturbo 286 plugs into a half-size slot.

PCturbo 286E with Orchid's productivity software and 1M byte of random-access memory costs $1,195. An optional daughtercard with 1M byte of memory costs $395. The Tinyturbo 286 costs $695.

Orchid Technology, 47790 Westinghouse Drive, Fremont, Calif. 94539.

■

Tecmar, Inc. has introduced **640 Plus**, a Lotus Development Corp.-certified memory board said to give the IBM Personal Computer, Personal Computer XT, AT and compatibles the power to expand the size of spreadsheets, data bases and files.

The memory board implements the Lotus/Intel/Microsoft Expanded Memory Specification.

The 640 Plus costs $475 for 256K bytes, $595 for 512K bytes, $995 for 1M byte and $1,395 for 2M bytes.

Tecmar, 6225 Cochran Road, Solon, Ohio 44139.

Services

Meditor has released **Cost Justifying Personal Computers** and **Realizing the Potential of the Business PC with Symphony**, two videotapes.

The first introduces criteria for evaluating the benefits of computers for an office and how to increase the productivity of an existing personal computer.

The second describes the long-term computing requirements for the business PC user and how integrated software satisfies the organizational need for a companywide computing solution.

Each video costs $195 for VHS or Beta and $249 for ¾-in. tape.

Meditor, P.O. Box 664, Lake Zurich, Ill. 60047.

■

General Electric Information Services Co. has announced that it is allowing

PRINTERS'

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When you see our new Pinwriter™ P6, P7 series dot matrix printers, you'll think you're in a time warp.

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free uploading of public domain software programs on Roundtable offerings of the **General Electric Network for Information Exchange** (GENIE)

Through May 31, there will be no charge on GENIE during nonprime time for uploading to the GENIE Roundtables of Shareware or Freeware, which is in the public domain.

Uploading and downloading of the public domain software is done using the Xmodem error-free asynchronous file transfer protocol.

General Electric Information Services, 401 N. Washington St., Rockville, Md. 20850.

■

Computer Training Services has announced the **"Guide to Small Business Bookkeeping Software Priced Under $1,000."**

The 150-page guide is said to compare 10 bookkeeping packages. It includes a critique of each system and a glossary explaining all features and how they are used. An industry/size table shows how different systems fit different businesses.

The book costs $69.50.

Computer Training Services, 5900 Tudor Lane, Rockville, Md. 20852.

Auxiliary equipment

Topaz, Inc. has announced the **Power Director**, a multioutlet power control center designed to protect personal computer systems from voltage spikes and power surges.

The Power Director features five power outlets. Each outlet is controlled by a separate switch. There is also a master switch. Power Director is available with a media storage slot, with the Data Director that allows two computers to share one peripheral or two peripherals to be accessed from one computer port. Power Director is also available with the Print Saver, which allows users to operate a computer and printer at the same time.

Prices range from $195.95 to $495.95.

Topaz, 9150 Topaz Way, San Diego, Calif. 92123.

■

Buddy Products has introduced the **Continental**, a computer storage center.

The Continental provides work space, storage and security for personal computers, business micros or mainframe terminals. It includes a rollout printer stand with a slot to accommodate back- or bottom-feed printers and a lower shelf for paper storage, power cord guides, a built-in data rack for storing file folders and top and bottom locks.

The Continental is priced at $777.

Buddy Products, 1350 S. Leavitt St., Chicago, Ill. 60608.

■

Sola, a unit of General Signal, has announced the **Personal Computer Power Conditioner** (PCPC), a portable 500VA plug-in power conditioner.

The power conditioner is said to operate as a portable dedicated line. According to the vendor, it protects personal computers from virtually all AC power problems except total line failure.

The 150VA PCPC costs $129. The 300VA unit costs $169, and the 500VA unit costs $209.

Sola, 1717 Busse Road, Elk Grove Village, Ill. 60007.

COMMUNICATIONS

Controllers

Datem Ltd. has announced the **DDCM220 Data Communications Module** and the **DDCB220 Data Communications Module**, said to provide a serial gateway between Datem Bitbus-compatible networks and RS-232-based control units.

The modules feature two

Continued on page 120

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FUSION

NEW PRODUCTS/COMMUNICATIONS

Continued from page 119

asynchronous serial channels offering transmission up to 19.2K bit/sec. and an 8-bit parallel printer interface.

The DDCM220 comes with a firmware package providing control over the local I/O resources and presenting a command interface to the remote Bitbus master station. The DDCB220 adds Datem's DDCBasic interpretive language.

The DDCM220 costs $525, and the DDCB220 costs $925.

Datem, 148 Colonnade Road, Nepean, Ont., Canada, K2E 7R4.

■

Case Communications, Inc. has introduced the **500A/56 Data Service Unit/Channel Service Unit** (DSU/CSU), said to allow full-duplex access to AT&T's Digital Data Service (DDS).

The user can choose any of the five available DDS service rates up to 56K bit/sec. in a single unit. The 500A/56 operates in point-to-point, multipoint, polled and limited-distance modem environments.

All options and switches are accessible behind a pull-down door on the stand-alone version and on the front bezel of the rack on rack-mount units. A standard rack can accommodate 16 rack-mount units. Both RS-232 and V.35 interfaces are standard.

The 500A/56 DSU/CSU costs $1,295.

Case Communications, 2120 Industrial Pkwy., Silver Spring, Md. 20904.

■

Contemporary Control Systems, Inc. has introduced the **S871-200**, an enhanced version of its S871 local-area network controller.

The controller now supports 24-bit addressing of the module. It supports Datapoint Corp.'s Arcnet token-passing, local-area network on the bus. Its internal buffer can be accessed using anywhere from 16 to 24 lines of memory addressing, facilitating interfacing to processors such as the Intel Corp. 8088 and 80188.

The S871-200 is priced at $495.

Contemporary Control Systems, 2733 Curtiss St., Downers Grove, Ill. 60515.

Voice/data communications

New Generation Technology has unveiled **Merge**, an intelligent integrated voice/data electronic mail modem phone with a two-line display.

According to the vendor, Merge interfaces with computers or can be used stand-alone. It contains a microprocessor, on-board random-access memory and a modem capable of either 300 or 1,200 bit/sec. transmission rates.

Merge also features an electronic mail processor, speed dialing, speakerphone, autodial and redial, a programmable keyboard and the ability to set daily reminders and review incoming and outgoing phone calls.

Merge is priced at $695.

New Generation Technology, 4952 Warner Ave., Huntington Beach, Calif. 92649.

Protocol converters

GSD Systems, Inc. has announced the **Perle PDS 350/294 protocol converter** for the IBM System/34, 36 and 38.

The unit is said to provide four, eight, 12, 16 or 20 asynchronous ports that can be used by remote devices to emulate IBM workstations and printers. It allows a 19.2K bit/sec. connection to the host system. It supports IBM file transfer programs and features direct memory access architecture, multiple microprocessors, automatic speed detection, dynamic terminal selection, printer pass-through on all ports and time-out disconnect.

The Perle 350/294 is priced from $4,650 to $15,350.

GSD Systems, Suite 505, 600 S. Dearborn, Chicago, Ill. 60605.

■

Datagraf, Inc. has announced the **Series II 3270 Coax-to-Multidropped Protocol Converter**.

The converter is said to allow up to eight IBM 3270 converters to be selectively converted on an individual basis to a multidropped protocol of the user's choice. It can support IBM 3276, 3277 and 3278 terminals.

The eight-port converter costs $5,945.

Datagraf, 100, 6626 Silvermine Drive, Austin, Texas 78736.

If you buy a TI 855 printer now, you won't have to upgrade to one later.

Don't tack just any printer on your new PC for now, thinking that you'll get what you really need later. Start with the best, a TI 855 or TI 865 printer. That way you can put the money you'd have spent on a needless upgrade on some other smart investment.

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NEW PRODUCTS/COMMUNICATIONS

Multiplexers/modems

Data Race, Inc. has announced the **Mach** family of modular asynchronous statistical multiplexers.

The multiplexers can be expanded from four to 16 communications ports. They can be used for both tail circuit operation and the connection of small clusters of terminals that may not be within the same 50-ft radius. Data speeds of terminals connected through Machs may be set for rates up to 19.2K bit/sec.

The Mach four-channel master unit costs $895. The Mach four-channel slave expander unit costs $795.

Data Race, 5839 Sebastian, San Antonio, Texas 78249.

■

Codex Corp. has announced **enhancements** and adaptive data pulse code modulation (ADPCM) **voice cards** for the company's **6240 Digital Transmission Multiplexer**.

The software enhancements provide dynamic bandwidth allocation, automatic DS-1 aggregate fallback and channel routing.

The dual-port voice module supports both ADPCM at 32K bit/sec. or pulse code modulation at 64K bit/sec.

The 6240 multiplexer costs from $12,000 to $90,000. The ADPCM voice cards cost $1,250.

Codex, 20 Cabot Blvd., Mansfield, Mass. 02048.

■

Pilkington Communication Systems, Inc. has announced the **3128 Fiber Optic Multiplexer**.

The multiplexer is said to accept four coaxial inputs from IBM 3274 controllers, IBM or Pilkington multiplexers or a combination. The 3128 can be expanded to handle up to 128 ports on one fiber-optic cable.

According to the vendor, the 3128 is compatible with any IBM network requirement. Transmission distance is up to 10,000 ft between multiplexers. The 3128 can be rack mounted or free standing.

The 3128 costs $2,500.

Pilkington, 65 Moreland Road, Simi Valley, Calif. 93065.

Test equipment

Fotec, Inc. has announced the **Fotec V100** fiber-optic microscope kit.

The kit is said to be able to inspect all fiber-optic connectors and bare fibers. It includes a Fotec V100 microscope and up to five adapters for different connectors and bare fibers.

Connectors can be inspected for polish quality, scratches, cracks and pistoning. The kit has a built-in illuminator.

Pricing ranges from $125 to $210, depending on the connector adapters chosen.

Fotec, The Schrafft Center, Box 246, 529 Main St., Boston, Mass. 02129.

■

L-Com Data Products has announced the **RS-50**, a pocket tester said to allow configuration of an RS-232 interface.

Each line of the interface except Pin 1 can be opened by means of the 24 independent slide switches. Twenty-four pairs of test points are also provided, one on either side of each switch to allow for patching the desired lines and for monitoring of all signal paths.

The user can effect loopback functions and determine which network components are defective.

The RS-50 comes with 10 jumper cable wires and a carry case. It costs $59.95.

L-Com Data Products, 1755 Osgood St., North Andover, Mass. 01845.

Auxiliary equipment

Craig Data Cable Co. has announced its **Multi-Link User Programmable Interface Cable** designed for RS-232 asynchronous interfaces.

The cable is said to enable the user to select configurations covering 95% of applications when interfacing equipment such as printers, plotters, CRTs terminals and modems. A new cable is not required for new equipment, just a change in selectable switches to the new configuration.

The standard cable has RS-232-male-to-RS-232-male connectors on each end and is 10 ft long.

The Multi-Link User Programmable Interface Cable is priced from $19.95.

Craig Data Cable, 652 Glenbrook Road, Stamford, Conn. 06906.

■

Microframe, Inc. has announced **Datalock 4000**, a dial-up access control system designed to provide secure dial-up access to any mainframe, mini or micro for an unlimited number of authorized users.

Datalock 4000 can accommodate up to 4,096 incoming lines in standard 19-in., rack-mount modules. It simultaneously supports automatic algorithm comparison, password/callback, random password generation and data encryption. The system costs $3,150 for the rack and either $350 or $400 for each line.

Microframe, 2551 Rt. 130, Cranbury, N.J. 08512.

■

Datakey, Inc. has introduced the **Netlock Security System** said to provide user-defined host and data access control for RS-232 or dial-up synchronous networks.

The Netlock system is an add-on module that serves as a gatekeeper between the terminal and host computer. It stores all passwords and personal identification data in a

Continued on page 122

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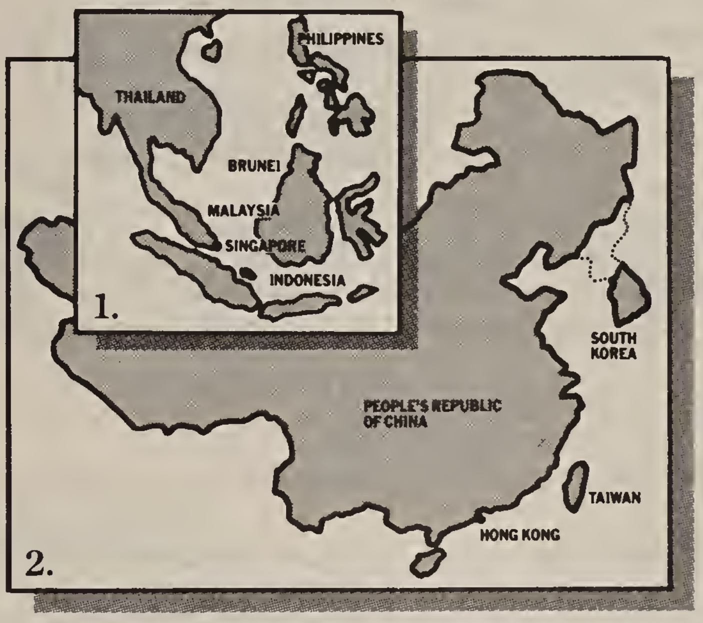

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Continued from page 121

device called the Data Key. The Data Key contains a read/write memory chip that can store up to 250 characters for an assigned user, the vendor said.

The Netlock module is offered with or without an integral modem. Without an integral modem, it costs $600. With an integral modem, it costs $1,000.

Datakey, 12281 Nicollet Ave., Burnsville, Minn. 55337.

SYSTEMS & PERIPHERALS

Processors

Force Computers, Inc. has unveiled the **Microforce-1A**, a multiuser VME-based Unix development system.

Microforce-1A implements AT&T's Unix System V Release 1 on a Motorola, Inc. 68010 microprocessor with 128K bytes of local, no-wait state memory; 2M bytes of global VME main memory; one VME expansion slot; and 50M bytes of unformatted Winchester disk storage.

It costs $8,995.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030.

■

Plessey Microsystems, Inc. has announced the **PME SIO-3**, a Digital Equipment Corp. VMEbus-compatible I/O subsystem designed to reduce processor and bus load.

The PME SIO-3 is reportedly a complete eight-channel I/O subsystem designed around an Intel Corp. 8086 processor with all on-board activities controlled by erasable programmable read-only memory-resident firmware.

The subsystem allows users to configure software in up to eight asynchronous RS-232 serial channels or seven serial and one Centronics Data Computer Corp.-compatible parallel channels.

The PME SIO-3 can handle eight users simultaneously at speeds up to 9.6K bit/sec., the vendor said.

The product costs $1,137.

Plessey Microsystems, One Blue Hill Plaza, Pearl River, N.Y. 10965.

■

Independent Business Systems, Inc. has announced a 16-bit version of its **3000 and 4000 series Ultraframe** multiuser microcomputers.

Based on its 8-MHz Intel Corp. 80186 slave processor boards, the systems are said to provide throughput at 2M bit/sec. The 16-bit Ultraframe reportedly uses an IEEE 696 standard S-100 bus architecture and is capable of supporting up to 32 users in the same chassis.

The Ultraframe supports hard drives and tape backup systems of up to 1,160M bytes and 67M bytes, respectively.

A typical system with a 74M-byte hard disk, a 1.2M byte, 8-in. floppy with 16 users costs $34,020, the vendor said.

Independent Business Systems, 5915 Graham Center, Livermore, Calif. 94550.

CAD/CAM/CAE

Skok Systems, Inc. has introduced the **Artech 320** line of bundled computer-aided design and drafting systems.

The Artech 320 family is based on the Motorola, Inc. MC68020 32-bit processor in a Hewlett-Packard Co. Model 320 workstation. The family includes 12-in. and 19-in. color and monochrome monitors, a graphics tablet and pen and a range of plotters and peripherals. The systems can be networked together or to the Artech 310 systems.

Three models are available: the basic Worksystem, the Designsystem and the top-of-the-line 320GP Designsystem. Prices are $34,900, $44,900 and $74,900, respectively.

Skok Systems, 222 Third St., Cambridge, Mass. 02142.

■

Calma Co. has announced the **Logic Series**, a modular family of computer-aided engineering and test systems.

The Logic Series includes three packages: Logic Scribe for schematic entry and project management, Logic Explorer for interactive design analysis and verification and Logic Examiner for interactive test development and verification.

They are said to be compatible with any system capable of outputting Tegas Design Language format.

All three packages are available as part of an Apollo Computer, Inc. Domain Series 3000-based system.

Continued on page 124

We're making the 3270 world a better place to live.

The Micro Plus family of 3270 terminal emulation and networking products utilize proprietary high performance hardware to offload the mainframe and PC/XT/AT from menial peripheral tasks. Ultra fast file transfer is standard in all Micro Plus products.

Find your cost effective 3270 solution with Micro Plus products.

✓ COAX TERMINAL PLUS
3274 Connect
3276 Connect
43XX DPAdapter

Multi-task PC DOS and 3278/79 coax terminal emulation simultaneously.
Dramatically outperforms all other competitors in file transfer speed.
Requires only 17K of PC resident memory for terminal emulation functions.
Runs all major software packages and offers distinct performance advantages.
MVX/TSO, VM/CMS, DOS/VSE and CICS editor and host installed file transfers.
Provides on-line keyboard/display configuration and pop-up help screens.

✓ REMOTE WORKSTATION PLUS
SNA 3274
BISYNC 3274
X.25 PDN

Emulates a 3274 controller with line speeds up to 56,000 bits per second.
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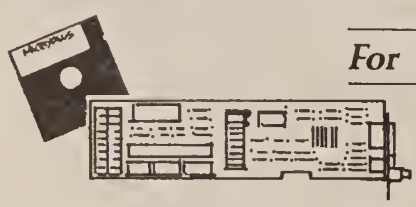

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Each and every Fujitsu printer has another remarkable feature—it works as promised. Because from engineering, to manufacture, to support after the sale, we never compromise on quality. Fujitsu America backs that commitment with warranties of up to one year and MTBF ratings of up to 6000 hours.

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Continued from page 122

Logic Scribe costs $19,400 for monochrome and $27,300 for color. Logic Explorer and Logic Examiner each cost $50,000 for monochrome and $58,000 for color. Logic Examiner is available as an Apollo DN570A-based system for $82,000.

Calma, 501 Sycamore Drive, Milpitas, Calif. 95035.

Data storage

Dyna Five Corp. has announced a Digital Equipment Corp. Q-bus-compatible 10½-in. **system enclosure**.

Designed to support Fujitsu Ltd. 8-in. Winchester disk drives, the enclosure offers internal peripheral mounting and a power supply to accommodate configuring systems with combinations of 8-in. or 5¼-in. peripherals.

Front access to peripherals and rear access to CPU, memory and controllers are provided in pedestal, desktop and rack mounted configurations, according to the vendor.

With a 360W power supply, the enclosure costs $1,895.

With a 750W power supply, it costs $2,395.

Dyna Five, 12040 Western Ave., Garden Grove, Calif. 92641.

■

Southern Data Systems, Inc. has announced the **Model 2290-120 Fixed/Removable Disk Drive** for Wang Laboratories, Inc. 2200 systems.

The drive is said to feature both fixed and removable storage in a single unit and a storage module drive interface. It is configured with 30M bytes of removable storage and 90M bytes of fixed storage.

The Model 2290-120 drive unit costs $6,995. The complete Model 2290-120 Fixed/Removable Storage System, including the 2290-120 drive, a 2290 data processing unit disk controller, one data cartridge and 6-ft data cables costs $8,995.

Southern Data Systems, 5115 Holly Ridge Drive, Raleigh, N.C. 27512.

■

Bering Industries, Inc. has announced the **8020-RM** Bernoulli mass-storage subsystem designed for Hewlett-Packard Co. CS/80 and SS/80 computers.

The 8020-RM subsystem features an 8-in., 20M-byte removable cartridge. Bering Industries said it offers average read/write transfer rates of 655/364 and an average seek time of 40 msec. According to the vendor, memory capacity can be increased 20M bytes at a time by adding cartridges.

The 8020-RM costs $4,890, the vendor said.

The 20M-byte cartridges cost $95.

Bering Industries, 1400 Fulton Place, Fremont, Calif. 94549.

Terminals

CIE Systems, Inc. has added a Unix personality to its **CIE 7101** alphanumeric terminal designed for multiuser computer systems running under Unix or compatible operating systems.

Features allow Unix users to switch off the 25th status line and use it as part of the work space.

The terminal's 24 programmable function keys can be loaded by the host operating system or application program to reduce keystrokes.

The CIE 6101 is said to be compatible with IBM 3101, Applied Digital Data Systems, Inc.'s Viewpoint and Digital Equipment Corp.'s VT100 terminals. CIE Systems said the product functions as an add-on terminal for IBM Personal Computer AT multiuser conversions.

The CIE 7101 costs $595, the vendor said.

CIE Systems, P.O. Box 16579, 2515 McCabe Way, Irvine, Calif. 92713.

■

ID Systems Corp. has announced the **Kiss** color alpha terminal.

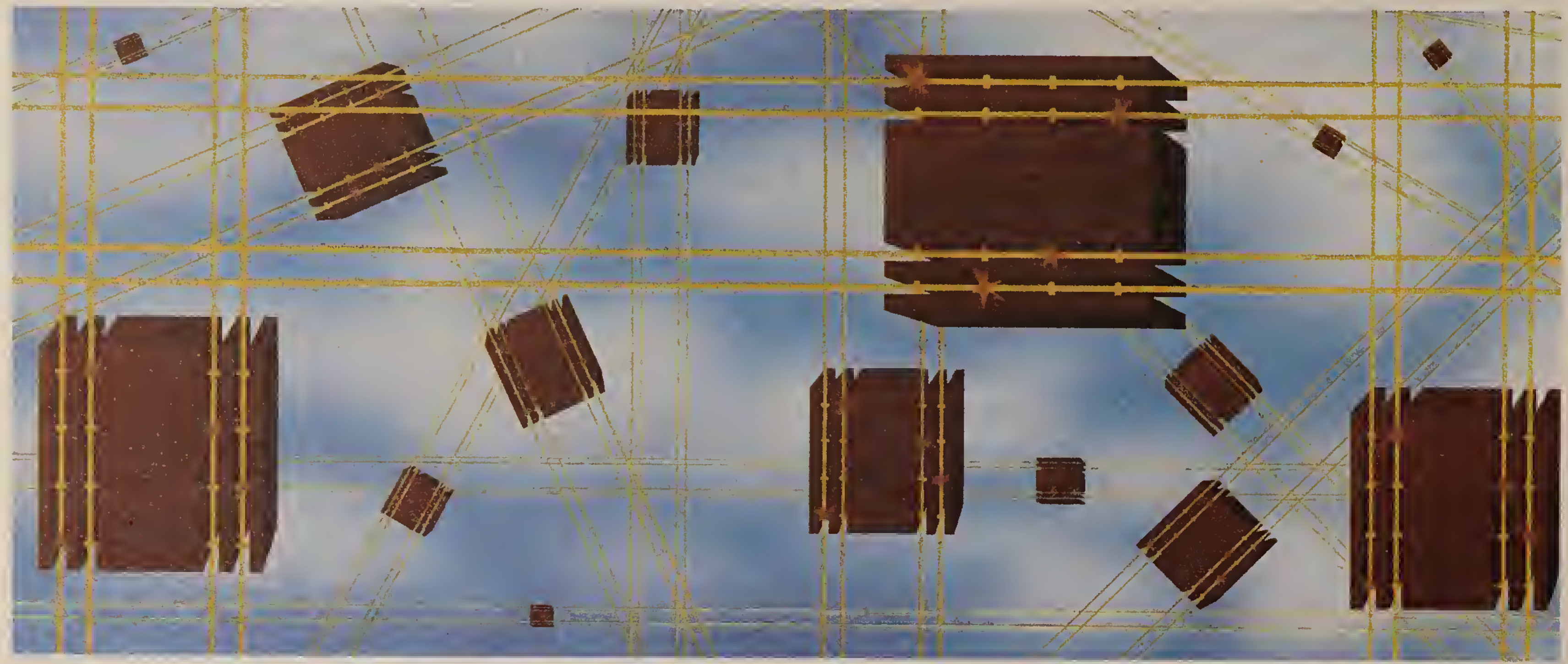
Kiss is said to feature eight foreground/background colors, full Digital Equipment Corp. VT100 and VT131 emulation, multiple keyboard support, an array of symbol graphics and host control capabilities and color mapping.

According to the vendor, Kiss communicates at speeds up to 19.2K bit/sec.

Kiss costs $1,595, ID Systems said.

ID Systems, 6175-W Shamrock Court, Dublin, Ohio 43017.

T-Bar presents the only 32-channel switch ready for Sierra™ and Apache™.



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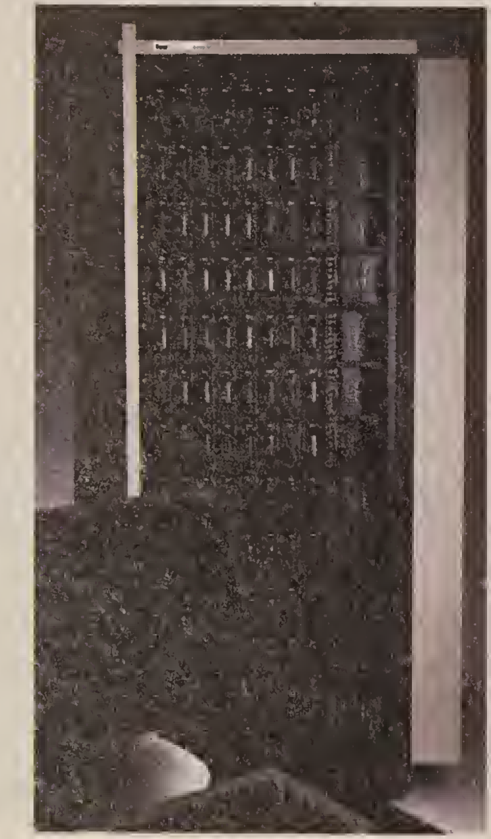

But that's not the whole story. Designed to manage the data processing resources in a multiple IBM or Amdahl mainframe environment, the CSM 3200 Series also gives you more performance than any other channel switch.

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The Most Data Integrity. The 3200 Series' unique switching design eliminates parity errors, glitches or phantom channel hits. Also, it minimizes skew errors, to approximately 10 ns, with no measurable pulse width distortion, and it generates no switching noise.

For even more reasons why the CSM 3200 Series is like no other channel switch matrix, call (203) 834-8300 or write us at 141 Danbury Rd., P.O. Box T, Wilton, CT 06897.

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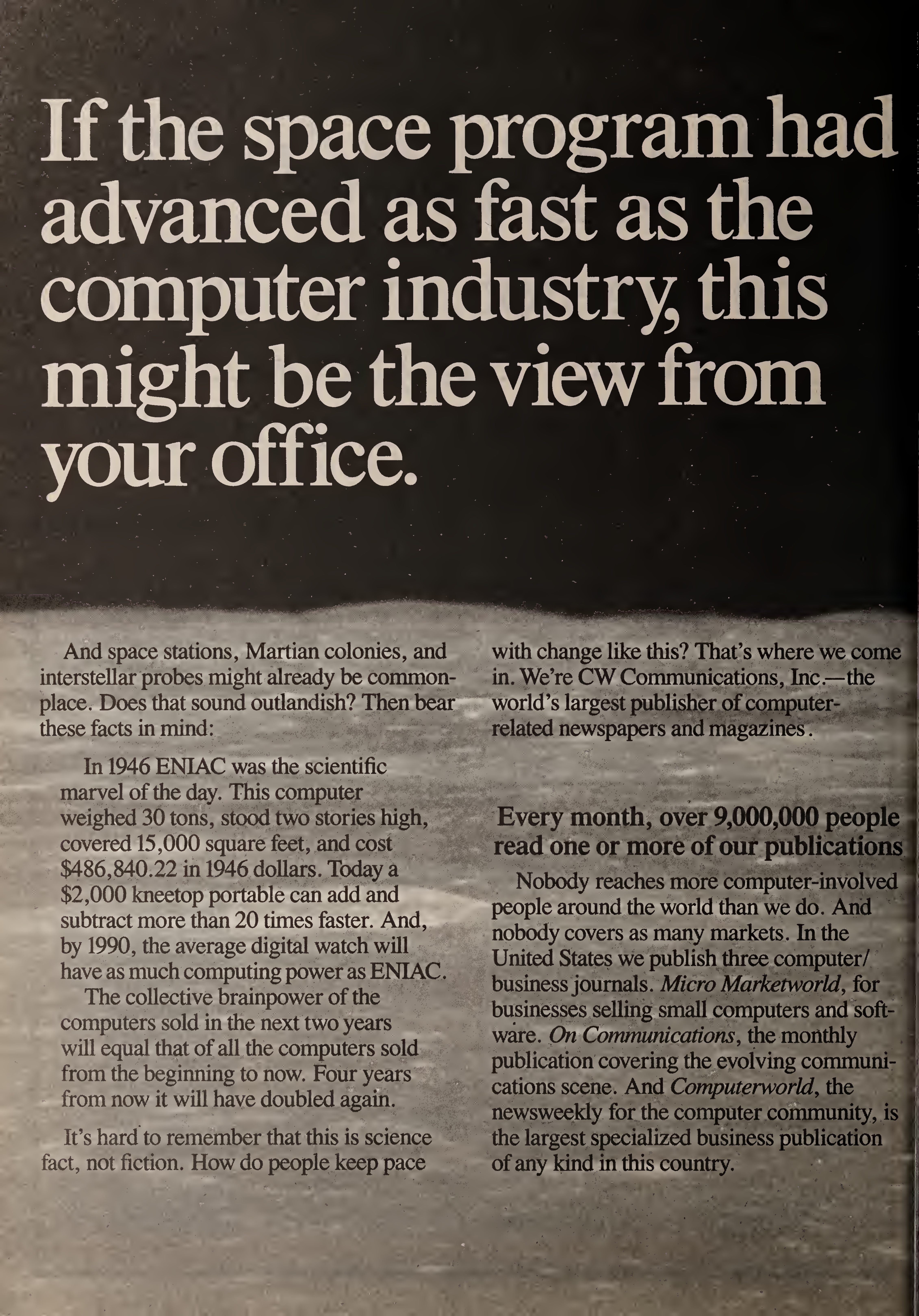

If the space program had advanced as fast as the computer industry, this might be the view from your office.

And space stations, Martian colonies, and interstellar probes might already be commonplace. Does that sound outlandish? Then bear these facts in mind:

> In 1946 ENIAC was the scientific marvel of the day. This computer weighed 30 tons, stood two stories high, covered 15,000 square feet, and cost $486,840.22 in 1946 dollars. Today a $2,000 kneetop portable can add and subtract more than 20 times faster. And, by 1990, the average digital watch will have as much computing power as ENIAC.
>
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We also offer seven personal computer publications. *InfoWorld*, the personal computer weekly, is a general interest magazine for all personal computer users.

The other six are monthly magazines that concentrate on specific microcomputer systems. *PC World*, the comprehensive guide to IBM personal computers and compatibles. *inCider*, the Apple II journal. *Macworld*, the Macintosh magazine. *80 Micro*, the magazine for TRS-80 users. *HOT CoCo*, the magazine for TRS-80 Color Computer and MC-10 users. And *RUN*, the Commodore 64 & VIC-20 magazine.

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Modgraph, Inc. has announced the **GX-1105** color graphics terminal, said to emulate the Tektronix, Inc. 4105.

The Modgraph terminal offers a 14-in. screen with resolution of 1,024 by 768 pixels and a choice of 16 colors from a palette of 4,096.

The GX-1105 has a Digital Equipment Corp. VT220-style keyboard and emulates the DEC VT100, including 132-col. display. It supports both a data tablet and a mouse.

The GX-1105 terminal costs $4,995.

Modgraph, 56 Winthrop St., Concord, Mass. 01742.

■

Computer Design & Applications, Inc. has announced the **MDP-4000 Imaging Console**.

The MDP-4000 is a multiformat, multiscreen display system. It contains a rack-mounted electronics chassis and up to eight interactive display stations. Each 19-in. display operates in 1,320- by 1,024-pixel resolution with 256 colors. It interfaces to the Q22 bus of the Digital Equipment Corp. Microvax II or to Unibus. A set of library routines is supported under the IBM VMS operating system.

The MDP-4000 is priced starting at $50,000.

Computer Design & Applications, 411 Waverly Oaks Road, Waltham, Mass. 02154.

Printers/plotters

Dest Corp. has added four models to its **Workless Station** document reader for dedicated word processing and office automation systems.

The models are said to incorporate type style recognition programs and text formatting capabilities. Seventy-five sheets of paper can be automatically fed into the system.

Model 235 offers eight memo-spaced type-style recognition programs. It costs $5,995. Model 236 has four additional proportionally spaced programs and costs $6,995. Both read a page of text in 25 seconds. Model 245 and Model 246 can read a page of text in 15 seconds. Model 245 costs $8,995. Model 246, with the additional proportionally spaced type styles, costs $9,995.

Dest, 1201 Cadillac Court, Milpitas, Calif. 95035.

Power supplies

Solidstate Controls, Inc. has announced **Powerbase 5000**, a series of uninterruptible power supply systems.

According to the vendor, the Powerbase 5000 series provides protection against power disturbances, including blackouts, brownouts, electrical noise, voltage transients, voltage instability and frequency deviation.

Features include a static transfer switch and a manual bypass switch. Models are available in sizes ranging from 30 kVA to 150 kVA.

Prices for the Powerbase 5000 series range from $25,000 to $75,000.

Solidstate Controls, P.O. Box 1216, Columbus, Ohio, 43216.

■

Electro Standards Laboratory, Inc. has introduced its **Models 303** and **308 Surge Guards**.

The devices are said to protect terminals and computers by surpressing large voltage transients.

Surge Guard is inserted between the data cable and the equipment connector. The Model 303 protects transmit data, receive data and signal ground inputs. The Model 308 Surge Guard Plus also protects five handshake control signals.

The Model 303 costs $34. The Model 308 costs $44.

Electro Standards Laboratory, P.O. Box 9144, Providence, R.I. 02940.

■

Para Systems, Inc. has announced the **Minuteman MM1000SS**, a 1,000W synchronized, sinewave output uninterruptible power supply.

It features a three-stage electromagnetic interference/radio frequency interference-filtered surge protector, 1 msec switch-over, overload protection in normal AC or inverter/battery mode and two alarm systems and three LED indicators for notification of normal AC or inverter/battery status.

The MM1000SS is priced at $1,399.

Para Systems, Suite 404, 11425 Mathis St., Dallas, Texas 75234.

Components

Nemonix, Inc. has announced a **16M-byte memory board** designed for Digital Equipment Corp.'s VAX 8600 and VAX 8650 computers.

The Nemonix board is said to use only one 8600 slot so that up to eight can be used in one system, providing a total of 128M bytes of memory. The board comes with a program of self-diagnostics and includes two spare chips.

The 16M-byte board costs $44,995.

Nemonix, 106 South St., Hopkinton, Mass. 01748.

■

HVE Engineering, Inc. has announced the **Synergist II 1000**, a Motorola, Inc. VMEbus board to Versabus backplane adapter.

The board consists of a standard VMEbus board mounted into a single, six-layer, "U"-shaped Versabus board that uses a low-profile daughterboard arrangement. All of the necessary signal and timing conversions are performed by the Synergist II 1000.

The Synergist II 1000 costs $498.

HVE Engineering, 1684 Dell Avenue, Campbell, Calif. 95008.

YOU DON'T HAVE A COBOL PROGRAM SO PATCHED AND TANGLED IT CAN'T BE STRUCTURED AUTOMATICALLY.

Until recently, there were only two ways to deal with the patched-up, hand-me-down, unstructured COBOL programs that consume up to 70 percent of your company's software effort.

You could continue to live with the old programs, patching and mending as best you could. Or you could scrap the programs, at enormous cost and disruption, in favor of an entirely new system.

But now there is a third alternative. COBOL structuring. The advantages of this alternative are enormous. Among them, the ability to reduce maintenance costs by 50 percent by more effectively using your programming resources.

The technological leader in COBOL structuring is Language Technology, Inc. In fact, of the very few companies who claim to have a COBOL structuring solution at all, Language Technology is the only one with a system, called RECODER,™ that is fully automatic. The others automate only a portion of the structuring task, leaving the really tough parts to be done manually, over a period of weeks or more, by trained experts, who, because they are human, will make mistakes.

Based on proprietary language processing techniques and pioneering research in graph theory, RECODER has reduced the tremendously complex mathematics involved to a provably correct solution so complete that it does not force you to accept its own style of structured code. You can select the level of nesting, type of operators, complexity of expressions, formatting style, representation of procedures, and many other features that might be required by your own in-house standards.

RECODER, available as a service or by license, can automatically structure thousands of lines of COBOL in minutes, without the necessity of adding

BENEFITS OF STRUCTURING

Source: T. Capers Jones	Unstructured	Completely Structured
Original program size (lines)	50,000	50,000
New code added (lines)	3,000	3,000
Programmer time (months)	12.5	6.5
Total cost	$75,000	$39,000
Defects at delivery	38	4
Stabilization period (weeks)	21	2
Meantime to failure (hours)	1.5	28

The benefits of structuring are illustrated in this example, representing the costs of adding 3000 lines of new code to an unstructured program of 50,000 lines, as compared to adding the same number of lines to the same size structured program.

NEW PRODUCTS/SYSTEMS & PERIPHERALS

EMC Corp. has announced the **HXP303** 3M-byte memory board for the Hewlett-Packard Co. HP 3000 Models 37 and 37XE.

The card features zig-zag, in-line pin design, an on-line/off-line switch and a double-bit fault indicator.

The HXP303 is priced at $13,500.

EMC, 12 Mercer Road, Natick, Mass. 01760.

PRICE REDUCTIONS

Migent Software, Inc. has announced a price reduction for its **Enrich** data base management system.

Enrich is driven entirely by business templates. It has over 40 templates for real estate, job costing, expense, personnel, sales and shipping.

Enrich is now priced at $395.

Migent, P.O. Box 6062, 865 Tahoe Blvd., Incline Village, Nev. 89450.

Versatec, Inc has reduced the price of its **ECP-42** electrostatic color plotter.

The 42-in. plotter features a multipass technique said to reduce plotter size and complexity by eliminating the need for multiple writing heads and associated electronics. It also reduces I/O, data handling and data storage requirements.

The ECP-42 now costs $85,000.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

■

Racal-Vadic, Inc. is offering a free enhancement kit to its **Model VA4224E** rack-mount modem.

The kit is said to eliminate data transmission errors and increase performance and compatibility. Errors are eliminated through Microcom Networking Protocol (MNP). The MNP implementation includes a feature said to eliminate handshaking delays with non-MNP modems.

Racal-Vadic, 1525 McCarthy Blvd., Milpitas, Calif. 95035.

■

Interleaf, Inc. has announced lowered prices for its **electronic publishing system.**

The system includes Interleaf's TPS software, a Sun Microsystems, Inc. 3/50 Sunstation or Apollo Computer, Inc.'s Domain Series 3000 personal workstation, 86M bytes of hard disk, backup tape, all fonts and the Interleaf LPR-308 laser printer.

The system is now priced at $29,900.

Interleaf, Ten Canal Park, Cambridge, Mass. 02141.

Ampex Corp. has announced price reductions on its **Model 219** and **Model 220** Digital Equipment Corp.-compatible terminals.

The Ampex Model 219 now costs $599. The Model 220, said to be the top of the line, now costs $649.

Ampex, 200 N. Nash St., El Segundo, Calif. 90245.

■

Comark Corp. has announced a price reduction for its **MC8639/35** Intel Corp. 8086-based single-board computer for the Intel Multibus system architecture.

The MC8639/35 is said to feature an on-board memory matrix comprising 36 sockets that can yield up to 1M byte of dual-port parity system random-access memory.

The MC8639/35 now costs $895.

Comark, P.O. Box 474, 93 West St., Medfield, Mass 02052.

■

QMS, Inc. has reduced the price of its **Conceptwriter VDI** intelligent graphics laser printer.

The Conceptwriter offers a resolution of 300 by 300 dot/in. for both text and graphics. It prints up to 8 page/min. and has a local processor and full bit-map memory.

The Conceptwriter now costs $4,495.

QMS, P.O. Box 81250, Mobile, Ala. 36689.

■

Supermac Technology has reduced the price of **Meg**, its hyperdrive-compatible random-access memory (RAM) upgrade for the Apple Computer, Inc. Macintosh.

According to the vendor, Meg is the only RAM upgrade for the Macintosh that is compatible with the hyperdrive internal hard disk.

The new prices are $549 for an existing 512K-byte system and $699 for a 128K-byte system.

Supermac Technology, 1901 Old Middlefield Way, Mountain View, Calif. 94040.

■

U.S. Lynx has cut the prices of the **HD 2000** and **FD 1000** models of its Intermedia disk and data conversion system.

The HD 2000 comes with a full library of formats and translation tables. It has two 5¼-in. drives, an 8-in. drive and a 10M-byte hard disk drive. It is priced at $15,950.

The FD 1000 is a floppy-disk-based system. It includes one 5¼-in. drive and two 8-in. floppy drives. It is priced at $10,950.

U.S. Lynx, 853 Broadway, New York, N.Y. 10003.

■

Nicolet Computer Graphics Division has announced price reductions for its **Zeta 824**, **Zeta 824C**, **Zeta 836** and **Zeta 836C** digital pen plotters.

The Zeta 824 and 824C now cost $8,900 and $9,900, respectively. The Zeta 836 and 836C now cost $11,900 and $12,900, respectively.

All Zeta plotters use eight carriage-mounted pens to plot on rolls of translucent paper, glossy bond, vellum, mylar or clear inking film.

Nicolet, P.O. Box 3020, Martinez, Calif. 94553.

consultants or any new people to your staff or of requiring any new skills of the people already on it. And, RECODER can do it with a cost effectiveness that will allow it to pay for itself within a year.

Because you hear a lot of promises from a lot of software companies, we can understand if you are skeptical about what we say we can do. That's why we want you to know that RECODER has been cutting its teeth on real world COBOL for four years now, successfully structuring millions of lines for such forward-looking companies as Federal Express, Hartford Insurance, Phillips Petroleum, and TRW. That's also why we want to give you the opportunity to put us to the test.

Send us up to 5,000 lines of your worst unstructured COBOL, maybe even that awful program written by the person who occupied your seat just before you did, and we'll structure it with RECODER for free.

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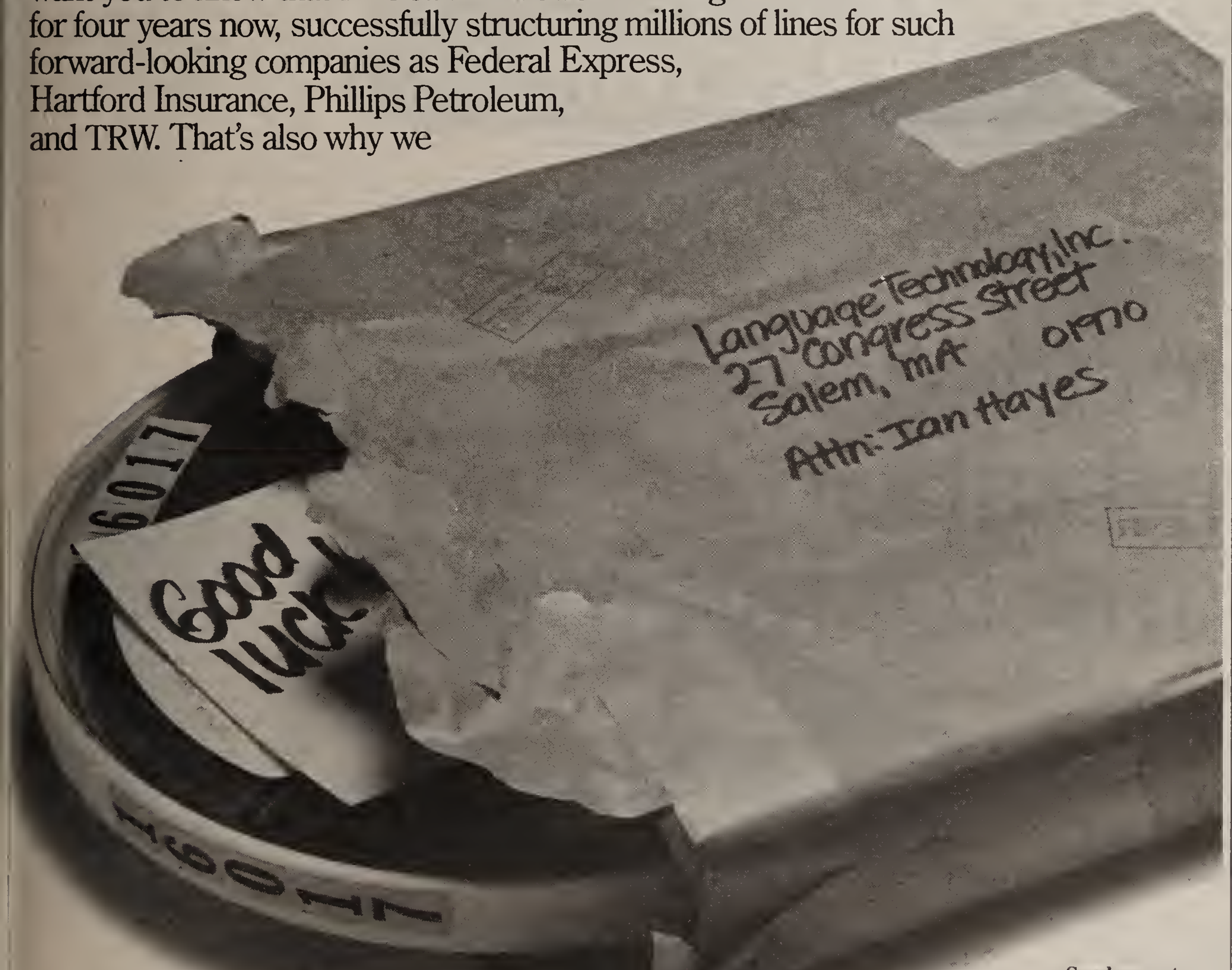

Send us up to 5,000 lines of your worst unstructured COBOL and we'll structure it for free.

WORLD DIGEST

Computerworld News Service

TOKYO — The Japanese computer software industry, which suffers from a chronic shortage of skilled programmers, got a lift last week when NEC Corp. announced that it was testing a system that automatically writes Cobol programs.

NEC said it will market the machine within a year.

NEC's experimental software speeds software development by automatically compiling the specifications that a computer will process, something that is now done manually.

SYDNEY, Australia — Wang Australia has posted a 55% increase in the company's sales for the first half of the current fiscal year.

Sales reportedly rose to $60.9 million, a total well above the company's worldwide figure. Sales totaled $39.2 million for the six-month period that ended in December.

Wang attributed the increase to a recent upsurge in demand for the VS range of minicomputers.

Wang Australia is now said to be Wang Laboratories, Inc.'s second largest subsidiary, trailing slightly its UK subsidiary.

SYDNEY, Australia — U.S. supercomputer vendor Cray Research, Inc. reportedly plans to open an Australian subsidiary, replacing its distributor, Techway Pty. Ltd.

Cray said it expects to sell at least one supercomputer a year in Australia.

The first Cray machine in Australia was acquired by that nation's Department of Defense.

The subsidiary is slated to start with a staff of six, according to Cray.

LONDON — Standard Telephone & Cables PLC (STC), the troubled UK computer and telecommunications company, ended fiscal 1985 $16.6 million in the red. The only profitable portion of the firm, it said, was International Computers Ltd., the mainframe computer maker that STC bought in 1984.

Lord Keith, STC's chairman, said that the red ink largely arose from disappointing sales in telecommunications and electronic components.

During 1985, STC spent $160 million on layoffs, plant closings and the sale of fringe businesses. Without those expenses, STC said it would have posted a $81 million profit.

MELBOURNE, Australia — The government of the Australian state of Victoria has developed a funding program designed to promote the export of locally developed software.

To qualify for the funding, the state's approximately 250 software houses must develop partnerships, consisting of two or more firms.

TOKYO — Hitachi Ltd. has termed "regrettable" a recent U.S. Department of Commerce ruling that Hitachi had dumped erasable programmable read-only memory chips on the U.S. market.

Another firm cited by the Commerce Department in that case, Fujitsu Ltd., said the ruling arose from an "unreasonable method" of price assessment and that it may terminate or cut back operations at its California semiconductor production facility in response.

TOKYO — The Japanese government has announced an agreement with Japan Telecom Co. under which the Japanese telecommunications start-up will take over operation of the Japanese National Railways' (JNR) 19.7 million-ft communications network.

With the announcement, Japan Telecom emerges as the foremost rival to Nippon Telegraph and Telephone Corp. (NTT) in the deregulated Japanese communications market.

The agreement requires that a JNR-affiliated telecommunications firm be established and then merged into Japan Telecom by 1989. The telecommunications firm will start business as a Type-1 carrier, shortly after the JNR is privatized in April 1987. Under current Japanese law, Type-1 carriers have their own circuits and

See **DIGEST** page 134

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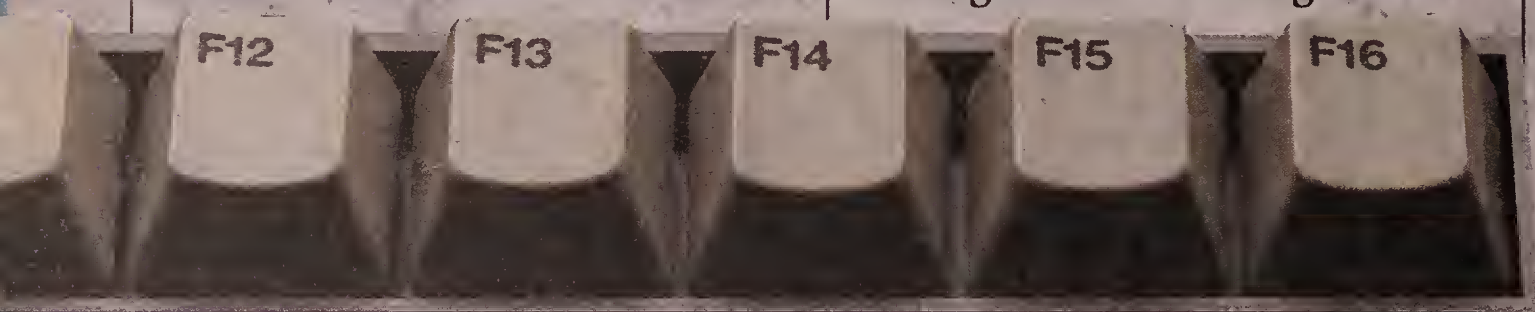
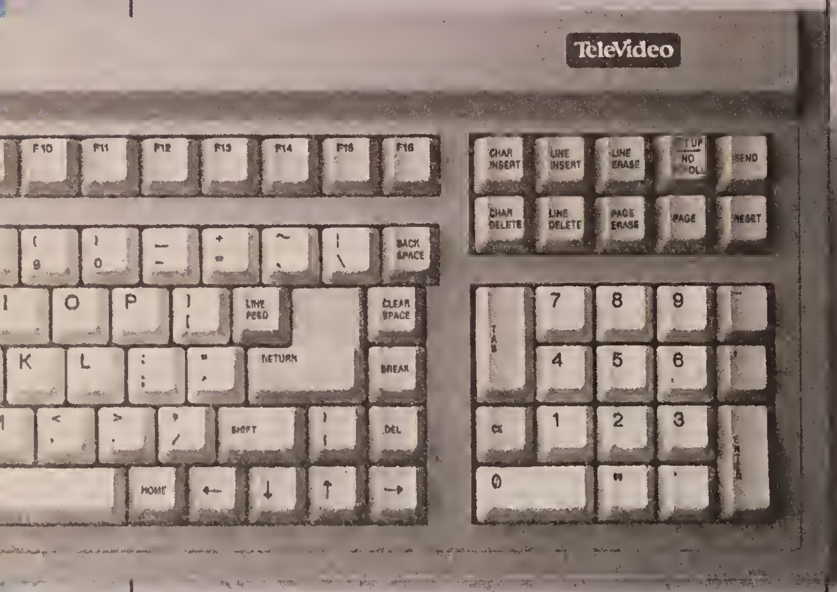


PROGRAMMABLE FUNCTION KEYS
16 special keys let you program sets of commands into simple, single keystrokes.

At $409, the TeleVideo 905 is the first of the new generation of "super-terminals," offering an extended feature set so powerful you'd think you were sitting at an expensive workstation.



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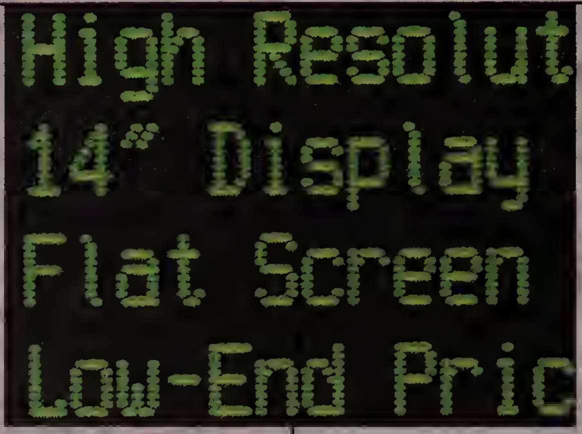


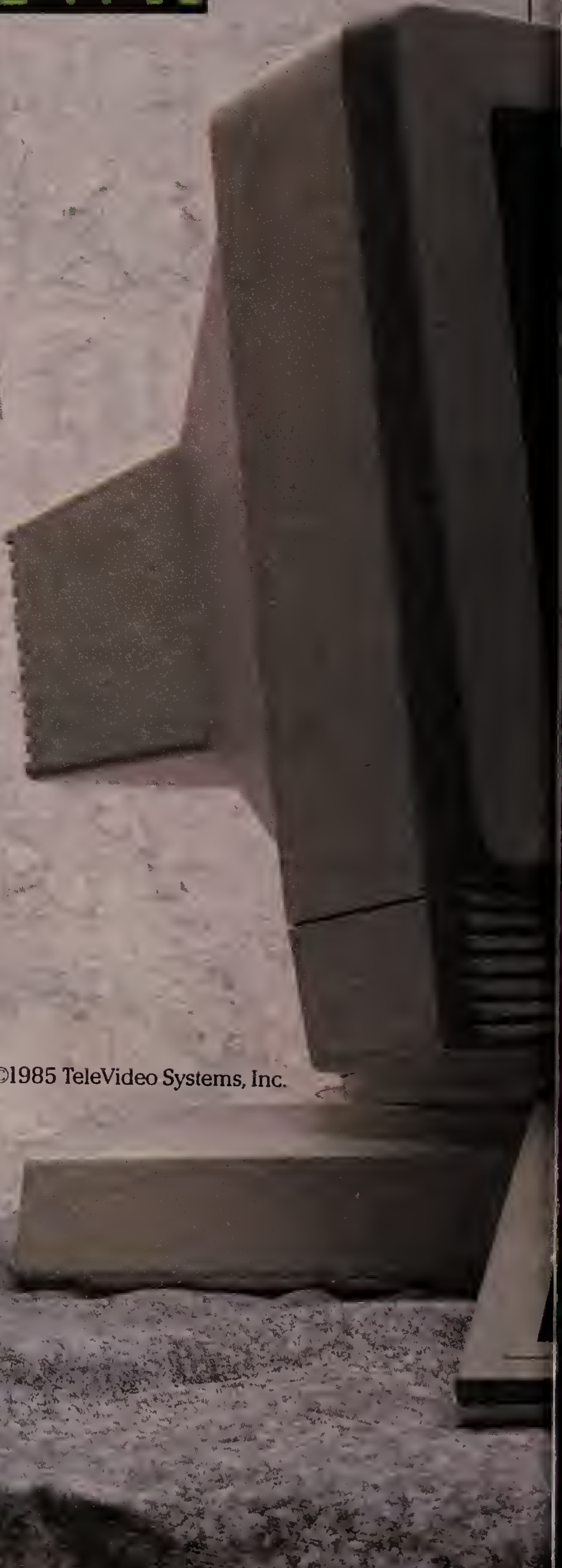
Start with 905's smooth, sleek design. The small footprint makes it a natural on any desk. The super high-contrast 14" screen offers the most readable image in the industry. And the screen tilts and swivels through a full 270° right and left, and from −5° to +15° up and down to reduce eyestrain, neck, and back problems.

What the screen does for the eyes, the keyboard does for the fingers. New sculptured keycaps make for smooth, comfortable typing. Sixteen non-volatile, programmable function keys eliminate repetitive keystroking. And the keyswitches have been tested to 100,000,000 strokes. About the only way to improve on our keyboard would be to add an enhanced numeric keypad.

Which we did.

This functional little terminal not only fits comfortably on any desk, it fits comfortably into most

HIGH READABILITY SCREEN
The 14" super-high resolution screen has more than just high contrast going for it. We also put more space between the characters for even better readability.



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any system, too. That's because it's compatible with the TeleVideo 925 command set, the most popular and widely emulated ASCII command set in the world. In addition, you can make your terminal think it's an ADDS Regent 25® Or a Viewpoint A2® Or Hazeltine™ or Lear Siegler.®

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There's even a buffered printer port (standard), so your users don't have to sit around waiting for hard copy.

The TeleVideo 905 is the latest in a long line of quality terminals that have been shipped to over half a million users, worldwide.

So if you'd like to find out more about a terminal that's short on hype but long on performance, just get in touch with the TeleVideo office closest to you. We'll send you full information right away. And if you'd like to check the 905 out from top to bottom, we'll be glad to help you get an evaluation unit.

The high performance TeleVideo 905. It'll change the way you think about low-priced terminals.

TELEVIDEO 905 VS. WYSE WY-30

FEATURES	TELEVIDEO 905	WYSE WY-30
INDIVIDUAL PROGRAMMABLE FUNCTION KEYS	YES	NO
TILT AND SWIVEL STANDARD	YES	NO
HIGH CONTRAST SUPER DARK MATSUSHITA SCREEN	YES	NO
WORDSTAR MODE	YES	NO
FULL SIZE KEYBOARD	YES	NO

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DIGEST from page 130

provide a complete array of telecommunications services. NTT is a Type-1 carrier.

STOCKHOLM — The Swedish Data Inspection Board has ordered the destruction of the codes that identify data base files kept on 15,000 Swedish citizens. The measure effectively stops the addition of new information to the data base, but it will not prevent use of data that has already been gathered.

The board's action represents a compromise between the interests of researchers who started the data base before Sweden had a data security law and the interests of those on whom files were kept.

The data base was the core of a research project called Metropolit that was launched at the University of Stockholm in 1963, 10 years before Sweden passed a data security law. It became a public issue when a daily newspaper disclosed that Metropolit had been secretly gathering data on all aspects of the lives of its subjects for more than 20 years.

TOKYO — Hitachi, Ltd. and Fujitsu Ltd. have announced the development of a standard operating system for 16-bit microprocessors used in industrial machinery.

Both operating systems will go on the market in the second half of this year and offer real-time processing at speeds 1.3 to 1.4 times faster than existing products, the vendors said.

Hitachi's operating system, ITOS-68K, and its Fujitsu equivalent, the MMU-286, were designed for use with Motorola, Inc.'s MC68000 or Intel Corp.'s 80286 microprocessor.

Both operating systems are said to be based on the Real-Time Operating System Nucleus, developed by a University of Tokyo research team as a standard for Japanese-language, real-time processing.

DUBLIN — An Irish businessman and Hughes Communications, Inc. have announced plans to develop jointly Ireland's first satellite system. The system will be under the majority ownership of Hughes Communications and the businessman, with the remaining 20% owned by Atlantic Satellites, Ltd., an Irish corporation. The satellite system will consist of two high-powered satellites and a satellite control center located in Shannon, Ireland.

HANNOVER, West Germany — Danish computer maker Christian Rovsing A/S has become a fully owned subsidiary of ITT Corp. The buyout was announced here at the Cebit trade fair by Rovsing and RC Computer, another Danish firm in which ITT has a minority share.

The move, which officials say had been expected, was precipitated by Rovsing's $7 million loss in an aborted deal with Air Canada. Rovsing had expected a large order for an integrated data network from the Canadian airline.

PARIS — A $120 million, European high-tech trade mart will be opened in Paris at the end of 1987. The mart, which sponsors say will receive 350,000 visitors during its first year, may force the French SICOB computer show to move farther outside of Paris.

In an apparent move to squeeze out SICOB, the Sari Building Society is seeking to buy the CNIT exhibition hall that houses SICOB each year. The building society, the equivalent of a bank, is a partner in the project to build the trade mart and wants to transform the CNIT into a luxury hotel complex, complete with a meeting hall for conventions.

TOKYO — In an effort to cash in on European demand for compact disks, Sony Corp. has announced plans to begin manufacturing compact disks in Salzburg, Austria, by the summer of next year. To produce the disks, Sony will establish a wholly owned firm to be called Digital Audio Disc Corp. (DADC). Sony will invest about $33.4 million in DADC.

Sony said it expects DADC will produce one million recorded compact disks a month, using 200 local employees. Products from DADC will be sold throughout Europe, where demand for compact disk products is expected to grow 50% this year.

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NEWS

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WEEK OF MARCH 30

MARCH 31-APRIL 1, NEW YORK — **Software Tools Conference on Artificial Intelligence/Expert Systems.** Contact: Software Tools Conference, Conference Office, Suffolk University, Boston, Mass. 02108.

MARCH 31-APRIL 2, RICHMOND, VA. — **The Annual Parnassus Management Conference**. Contact: Parnassus, Inc., 100 Boylston St., Boston, Mass. 02116.

MARCH 31-APRIL 2, TORONTO — **Systems Project Management.** Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 31-APRIL 3, ATLANTA — **Software Development for Government.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903. Also being held April 14-17 in Denver.

MARCH 31-APRIL 3, DALLAS — **Telecommunications Systems in Government.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903. Also being held April 14-17 in Atlanta.

APRIL 2, NASHUA, N.H. — **U.S. Invitational Computer Conference Series.** Contact: Suzanne Hubner, U.S. Conference Director, The Invitational Computer Conference, No. C-2, 3151 Airway Ave., Costa Mesa, Calif. 92626.

APRIL 2-3, DALLAS — **Fifteenth Annual ICP Million Dollar Awards and Executives' Conference.** Contact: Sue Stewart, International Computer Programs, Inc., P.O. Box 40946, 9000 Keystone Crossings, Indianapolis, Ind. 46240.

APRIL 2-3, SAN DIEGO — **Frost & Sullivan's Fourth Annual Computer Vertical Market Conference.** Contact: Carol Every, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

APRIL 2-4, HYANNIS, MASS. — **Software 2000 Charter Meeting.** Contact: Jeanie Vance, User Group Coordinator, Software 2000, Inc., One Park Center, Independence Park, Hyannis, Mass. 02601.

WEEK OF APRIL 6

APRIL 6-9, NEW ORLEANS — **Electronic Funds Transfer Association Annual Convention and Exposition.** Contact: Convention Coodinator, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

APRIL 7-10, BRAINTREE, MASS. — **Masscomp Users' Society Third Annual Meeting and Symposium.** Contact: Wendy Powers, Masscomp, One Technology Park, Westford, Mass. 01886.

APRIL 7-10, ORLANDO, FLA. — **International Operational Data Security Workshop.** Contact: International Association for Computer Systems Security, Inc., 6 Swarthmore Lane, Dix Hills, N.Y. 11746.

APRIL 7-10, SAN FRANCISCO — **1986 IEEE International Conference on Robotics and Automation.** Contact: Harry Hayman, Institute of Electrical and Electronics Engineers Council on Robotics and Automation, Exeter C3037, Boca Raton, Fla. 33434.

APRIL 7-10, WASHINGTON, D.C. — **Federal Office Systems Expo '86.** Contact: Renee Clark, National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

APRIL 7-11, CHICAGO — **Successful Project Management: The Common Sense Approach.** Contact: Lois Zells & Associates, Inc., 11402 N. 53rd Place, Scottsdale, Ariz. 85254.

APRIL 7-11, ORLANDO, FLA. — **Tutorial Week Orlando '86.** Contact: Martez A. Camilleri, Director of Tutorials, Institute of Electrical and Electronics Engineering Computer Society, 1730 Massachusetts Ave. N.W.,

See **CALENDAR** page 137

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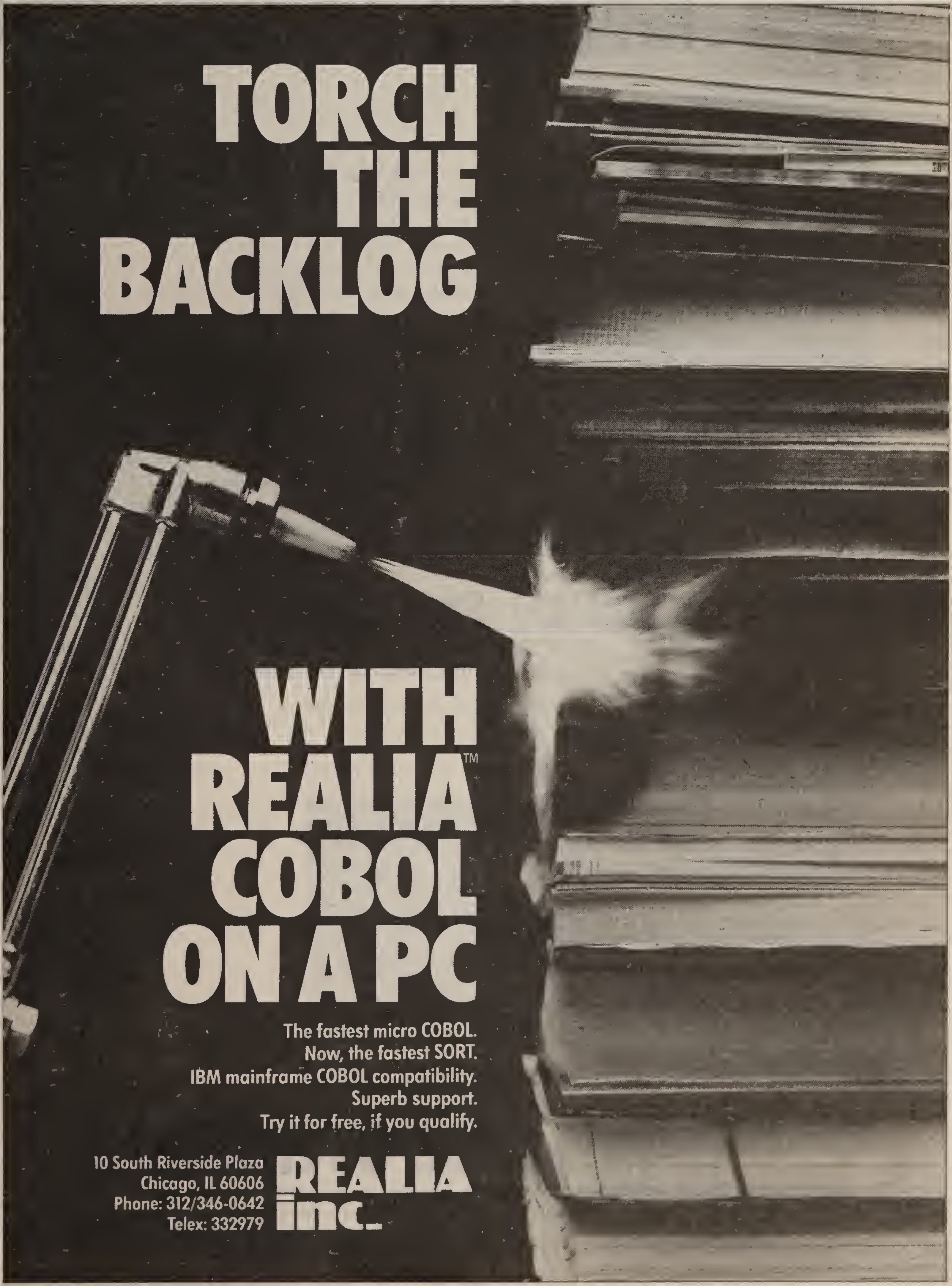

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New Semiconductor Technologies
(Executive Report, April 14) Silicon versus "glamour technologies," major research centers tell of efforts to downsize and speed-up chips. **Closing date March 28.**

Nonimpact Printers
(Product Spotlight, April 21) Focus on page printers; product comparisons; Japanese technology. **Closing date April 4.**

Software Maintenance
(Executive Report, April 28) Is it the programming issue of the century — and will two out of three programmers be doing exclusively maintenance by the year 2000? **Closing date April 11.**

Coming in May and June Executive Reports: Training End Users, May 5 (closing date April 18); Electronic & Voice Mail, May 19; (closing date May 2) In-house Publishing, May 26 (closing date May 9); BUNCH Companies, June 16 (closing date May 30); Integrated OA Systems, June 30 (closing date June 13).

Coming in May and June Product Spotlights: Disaster Recovery, May 12 (closing date April 25); Word Processing Software, June 2 (closing date May 16); Personal Computer Graphics, June 23 (closing date June 6).

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Washington, D.C. 20036.

APRIL 8-11, DALLAS — **Personal Computer Networks in Government.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903.

APRIL 9-11, LOS ANGELES — **Corporate Electronic Publishing Systems: A Conference/Showcase III.** Contact: Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

APRIL 9-13, SINGAPORE — **Communicasia '86.** Contact: Gerald Kallman, Kallman Associates, Five Maple Court, Ridgewood, N.J. 07450.

WEEK OF APRIL 13

APRIL 13-17, LAS VEGAS — **The 1986 National Interact Conference.** Contact: Management Science America, Inc., 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

APRIL 14-16, MONTEREY, CALIF. — **Information System Support for Integrated Design and Manufacturing Processes Workshop.** Contact: Michael J. Zyda, Naval Postgraduate School, Department of Computer Science, Code 52, Monterey, Calif. 93943.

APRIL 14-17, PHOENIX — **Twenty-Fourth International Magnetics Conference.** Contact: J. U. Lemke, Conference Chairman, #1103, 2400 6th Ave., San Diego, Calif. 92101.

APRIL 15-16, CHICAGO — **Systems/34, 36 and 38 Users Show.** Contact: Andrew Wahtera, The Producers, 360 Merrimack St., Lawrence, Mass. 01843. Also being held May 28-29 in Washington, D.C.

APRIL 16, NEW ORLEANS — **Comten Users' Exchange.** Contact: NCR Comten, Inc., 2700 Snelling Avenue N., St. Paul, Minnesota 55113.

APRIL 16-18, MADRID — **Personal Computers and Channels of Distribution in Europe Conference 1986.** Contact: Inteco Corp., Suite B-203, 800 Pollard Road, Los Gatos, Calif. 95030.

APRIL 17-18, HOUSTON — **Southwest Computer Measurement Group.** Contact: Ellen Robertson, Texas Utilities Services, Inc., 2001 Bryan Tower, Dallas, Texas 75201.

WEEK OF APRIL 20

APRIL 20-24, CHICAGO — **Robots 10 Conference and Exposition.** Contact: Robotics International of the Society of Manufacturing Engineers Public Relations, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

APRIL 20-25, NEW ORLEANS — **Twenty-Fourth Annual Conference of the Association for Educational Data Systems.** Contact: Association for Educational Data Systems — '86, P.O. Box 5689, Columbus, Ga. 31906.

APRIL 21, NEWTON, MASS. — **The Computer Industry in Massachusetts: Future Directions.** Contact: Deborah Dupee, Association for Women in Computing, Program Director, Suite 21, 66 Chiswick Road, Brookline, Mass. 02146.

APRIL 21-24, WASHINGTON, D.C. — **Sixth International Conference on Decision Support Systems.** Contact: Decision Support Systems — '86, 290 Westminster St., Providence, R.I. 02903.

APRIL 22-25, BOSTON — **Conceptual/Logical Modeling and Design: An Integrated Approach to Data and Process Methodology.** Contact: Bob Davoli, Charles River Development, 483 Beacon St., Boston, Mass. 02115.

APRIL 23-25, DALLAS — **Eighteenth International Management MIS Conference.** Contact: Bruce Brammer, Paper Industry Management Association, 2400 E. Oakton St., Arlington Heights, Ill. 60005.

APRIL 26, NEW YORK — **Fourth Annual APL as a Tool of Thought.** Contact: Devon McCormick, New York Special Interest Group on APL PDS, Suite 524, 660 Amsterdam Ave., New York, N.Y. 10025.

WEEK OF APRIL 27

APRIL 28-30, ALBUQUERQUE, N.M. — **Integrated Fiber-Optic Technology Training.** Contact: Linda Castle, Optoelectronic System Consultants, P.O. Box 35525, Albuquerque, N.M. 87176. Also being held June 23-25 in Albuquerque.

APRIL 28-30, AVIGNON, FRANCE — **Sixth International Workshop on Expert**

See **CALENDAR** page 138

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Systems and Their Applications. Contact: Jean-Claude Rault, Agence de l'Informatique, Tour Fiat — Cedex 16, 92084 Paris — La Defense, France.

MAY 1-2, TEMPE, ARIZ. — **Logic Programming and Its Applications In Expert Systems.** Contact: Center for Professional Development, College of Engineering and Applied Sciences, Arizona State University, Tempe, Ariz. 85287.

WEEK OF MAY 4

MAY 5-7, GENEVA — **Second World Congress of Production and Inventory Control.** Contact: World Congress Secretariat-2F, 500 W. Annandale Road, Falls Church, Va. 22046.

MAY 5-7, WILLIAMSBURG, VA. — **AM/FM International Regional Conference On Automated Mapping/Facilities Management.** Contact: Barbara Emery, Contract Administrator, AM/FM International, No. 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

MAY 7-9, SCOTTSDALE, ARIZ. — **Managing and Motivating For Improved Productivity.** Contact: Marilyn S. Bodeck, Data Entry Management Association, P.O. Box 16711, Stamford, Conn. 06905.

WEEK OF MAY 11

MAY 11-14, NEW ORLEANS — **Association for Systems Management Annual Conference.** Contact: Richard B. McCaffrey, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

WEEK OF MAY 18

MAY 19-21, HILTON HEAD, S.C. — **Audit Managers Symposium VII.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

MAY 19-21, SAN FRANCISCO — **Hammer Forum West: Change and Continuity in End-User Computing.** Contact: Michael Hammer, Hammer and Co., Hammer Forum West, Five Cambridge Center, Cambridge, Mass. 02142.

MAY 20-23, ORLANDO, FLA. — **Techex '86 Americas: The Annual World Fair for Technology Exchange.** Contact: Anne E. Klenner, Dr. Dvorkovitz & Associates, P.O. Box 1748, Ormond Beach, Fla. 32075.

WEEK OF MAY 25

MAY 29-30, SAN FRANCISCO — **Unix In Focus.** Contact: International Data Corp., Suite 201, 3350 West Bayshore Road, Palo Alto, Calif. 94303.

MAY 29-31, BLACKSBURG, VA. — **Personal Computer Interfacing For Scientific Instrument Automation.** Contact: Linda Leffel, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061.

WEEK OF JUNE 1

JUNE 2-5, DETROIT — **Vision '86 — Applied Machine Vision Conference and Exposition.** Contact: Vision '86 Public Relations, Machine Vision Association of the Society of Manufacturing Engineers, P.O. Box 930, Dearborn, Mich. 48121.

JUNE 2-5, NASSAU BAY, TEXAS — **International Symposium on Ada Programming Language Applications for Space Station Development.** Contact: University of Houston — Clear Lake, 2700 Bay Area Blvd., Houston, Texas 77058.

JUNE 4-6, SAN DIEGO — **1986 National Educational Computing Conference.** Contact: Susan M. Zgliczynski, National Educational Computing Conference 1986, School of Education, University of San Diego, Alcala Park, San Diego, Calif. 92110.

WEEK OF JUNE 8

JUNE 7, BEIJING — **China-Didacta '86: The International Trade Fair for Educational Equipment.** Contact: Swiss Industries Fair, Secretariat China Didacta '86, P.O. Box CH-4021, Basel, Switzerland.

JUNE 9-13, SAN DIEGO — **MUMPS Users' Group 15th Annual Meeting.** Contact: MUMPS Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

JUNE 10-13, ATLANTA — **Summer 1986 Unix Conference and Exhibition.** Contact: The Usenix Association Conference Office, P.O. Box 385, Sunset Beach, Calif. 90742.

WEEK OF JUNE 15

JUNE 16-20, CAMBRIDGE, MASS. — **Managing Information Technology: New Responsibilities in a Changing Environment.** Contact: Center for Information Systems Research, Sloan School of Management, MIT, E40-193, 77 Massachusetts Ave., Cambridge, Mass. 02139.

JUNE 17-19, ATLANTIC CITY — **Plas-Tech '86.** Contact: Delia Associates, P.O. Box 338, Delia Marketing Communications Center, Whitehouse, N.J. 08888.

WEEK OF JUNE 22

JUNE 22-27, PHILADELPHIA — **Management Information Systems for Strategic Advantage.** Contact: The Registrar, 200 Vance Hall, Office of Executive Education, The Wharton School of the University of Pennsylvania, Philadelphia, Pa. 19104.

JUNE 23-27, AMSTERDAM — **Fourth Annual European Fiber-Optic Communications and Local-Area Networks Exposition.** Contact: Information Gatekeepers, 214 Harvard Ave., Boston, Mass. 02134.

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Minisupercomputer manufacturers may offer stock this year

Analysts expect Alliant, Convex to file IPOs

By Stanley Gibson

Seeking to take advantage of an increasingly friendly climate in the public capital markets, several privately held minisupercomputer companies are preparing to offer stock to the public this year.

Convex Computer Corp. of Richardson, Texas, recently announced it has retained Goldman Sachs & Co. as an underwriter for an initial public offering (IPO), which observers speculate will occur in the fall. Meanwhile, Alliant Computer Corp. of Acton, Mass., one of Convex's competitors in the minisupercomputer market, sent out mixed signals on its plans for public financing. "We don't need to do an IPO right now. We're well capitalized," said David Micciche, Alliant's vice-president of marketing and sales. However, another company official said Alliant could be making a public offering before long.

"Just because we have money now doesn't mean we would not have an IPO," said R. Stephen Cheheyl, vice-president of finance, who even suggested that Alliant could come to the public market before Convex. Cheheyl would not comment on who might be the underwriter of an Alliant offering.

"I think Alliant will be filing very soon, and Convex will be filing very soon," said Michael Murphy, editor of the "California Technology Stock Letter." "The market is not hot yet; it is just opening up," Murphy continued, pointing to a current rate of one or two technology companies going public each week. "We will get to the point where it's five or 10 a week."

"It would not surprise me if, in a supportive market, Alliant goes public," said Jeffrey Canin, an analyst with Hambrecht & Quist Group in San Francisco. Alliant recently announced it had received additional financing of $11.5 million in a third round of venture capital in December.

CONVEX

Thus far, Alliant has received a total of $26.3 million in venture capital. Participants in each round of Alliant financing have been Hambrecht & Quist Venture Partners, Venrock Associates and Kleiner Perkins Caufield & Byers. Additional participants in the most recent round include Merrill Lynch, Pierce, Fenner and Smith, Inc., Hillman Co. and Morgan Stanley & Co.

"Hambrecht & Quist needs to do an underwriting, and it won't hurt Alliant to get the war chest they are going to get," Murphy said, suggesting that Hambrecht & Quist Group would likely be Alliant's investment banker. Alliant represents Hambrecht & Quist Venture Partners' largest single venture capital investment.

Alliant, which began shipping its products in the last quarter of 1985, attained profitability in that quarter, and will have shipped 22 machines by the close of the current quarter, the company said. Alliant's Micciche said he expects the benefits of an OEM agreement with Apollo Computer, Inc. to be felt in the near future as Apollo's customers begin to order the Alliant computers sold under the Apollo label. Of the 22 machines Alliant has sold thus far, 20 were sold to end users, and only two were sold to Apollo, the company said.

ALLIANT

Although Convex and Alliant compete in certain markets, the technology the two companies offer is different. Convex machines use vector processing while Alliant's computers form a family of expandable parallel processing machines.

Murphy said he expects another minisuper maker, Scientific Computer Systems Corp. (SCS) of Beaverton, Ore., to file a public stock offering in late 1986. SCS, which expects to ship its first machine in July, is building computers that will run programs written for Cray Research, Inc. supercomputers at 25% the speed of a Cray but priced at $600,000, considerably less than the several million dollars that Crays cost.

Thus far, the start-up company has received a total of $18 million in venture capital and currently has $10 million in cash, according to Robert Schuhmann, SCS chairman and chief executive officer.

"The market is, in general, getting better with each deal," Murphy said. "We are in the phase when the good companies can now come to the public market at fair valuations."

In the year's most publicized computer industry IPO, Microsoft Corp. recently offered its stock to the public at $21 per share, but the first trade in the over-the-counter market was made at $25 per share.

Sperry cuts professional staff by 500

BLUE BELL, Pa. — Citing greater reliance on automation and robotics in manufacturing, Sperry Corp. recently announced that it will lay off about 500 employees.

Those staff members laid off will not be assembly workers, however, but will be higher level technical, administrative and professional personnel at sites in Blue Bell, Minneapolis-St. Paul and Salt Lake City, according to company spokesman Michael Maynard.

The cutbacks will be in the company's commercial computer operation, which employs 37,000 out of the company's 67,000 total employees, and they will be ongoing, Maynard said.

The layoffs came despite strong orders for both Sperry's 1100/90 systems, the company's most powerful computers, and the company's microcomputer products, according to Maynard.

Orders for the 1100/90 system have been growing at a 15% annual rate while orders for microcomputer products have been increasing at an annual rate of 20% to 25%, Maynard said.

— **Stanley Gibson**

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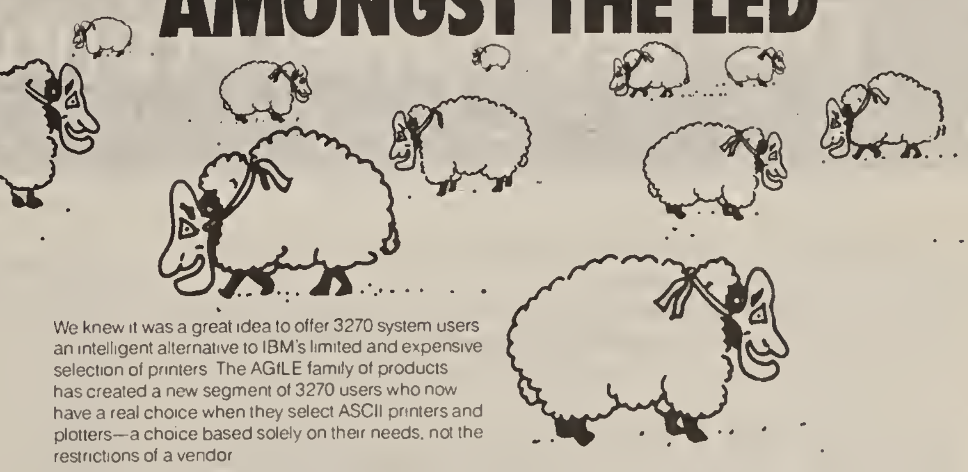

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Chip rulings a step in improving trade relations, analysts say

Surcharges provide temporary solution

By Maura McEnaney

U.S. Department of Commerce rulings that the Japanese chip makers illegally dumped semiconductor chips in the U.S. will result in some temporary relief for American chip manufacturers, but analysts say the rulings [CW, March 17] are just two of several actions needed to solve the trade problem with Japan.

"If nothing else, they bring attention to the fact that something has grown wrong with international trade," says E. F. Hutton & Co. analyst Edward White.

The Department of Commerce ruled earlier this month that several Japanese firms dumped both erasable programmable read-only memory (EPROM) chips and 256K-byte dynamic random-access memory (RAM) chips in the U.S. market and ordered the firms to post a bond on future imports of such chips. The preliminary rulings were the second and third to come from the Commerce Department, which in December said Japanese chip makers also dumped 64K-byte dynamic RAM chips.

Actions forthcoming

Analysts say that while the Commerce Department rulings send a direct message to Japan, more important government actions are forthcoming.

Last year the Semiconductor Industry Association filed a petition with the U.S. Trade Representatives seeking fair access to Japanese markets. That so-called 301 petition prompted negotiations between the U.S. and Japanese governments, scheduled to resume this Thursday.

"The recent dumping rulings do not affect other products," White says. "But if a negotiation is reached under the 301 petition, it is likely to take a lot of other products with it."

According to White, the import surcharges could help drive up the price of EPROM chips but not enough to save the industry.

> **''**
>
> *'If nothing else, the rulings bring attention to the fact that something has grown wrong with international trade.'*
>
> — Edward White
> E. F. Hutton & Co.

The Department of Commerce rulings are only a temporary solution for the U.S. chip makers, according to Dataquest, Inc. analyst Sheridan Tatsuno.

"All it does is give them a little breathing room," he says. Negotiations between Japanese and American governments must continue before the trade balance will begin to equal out, he says.

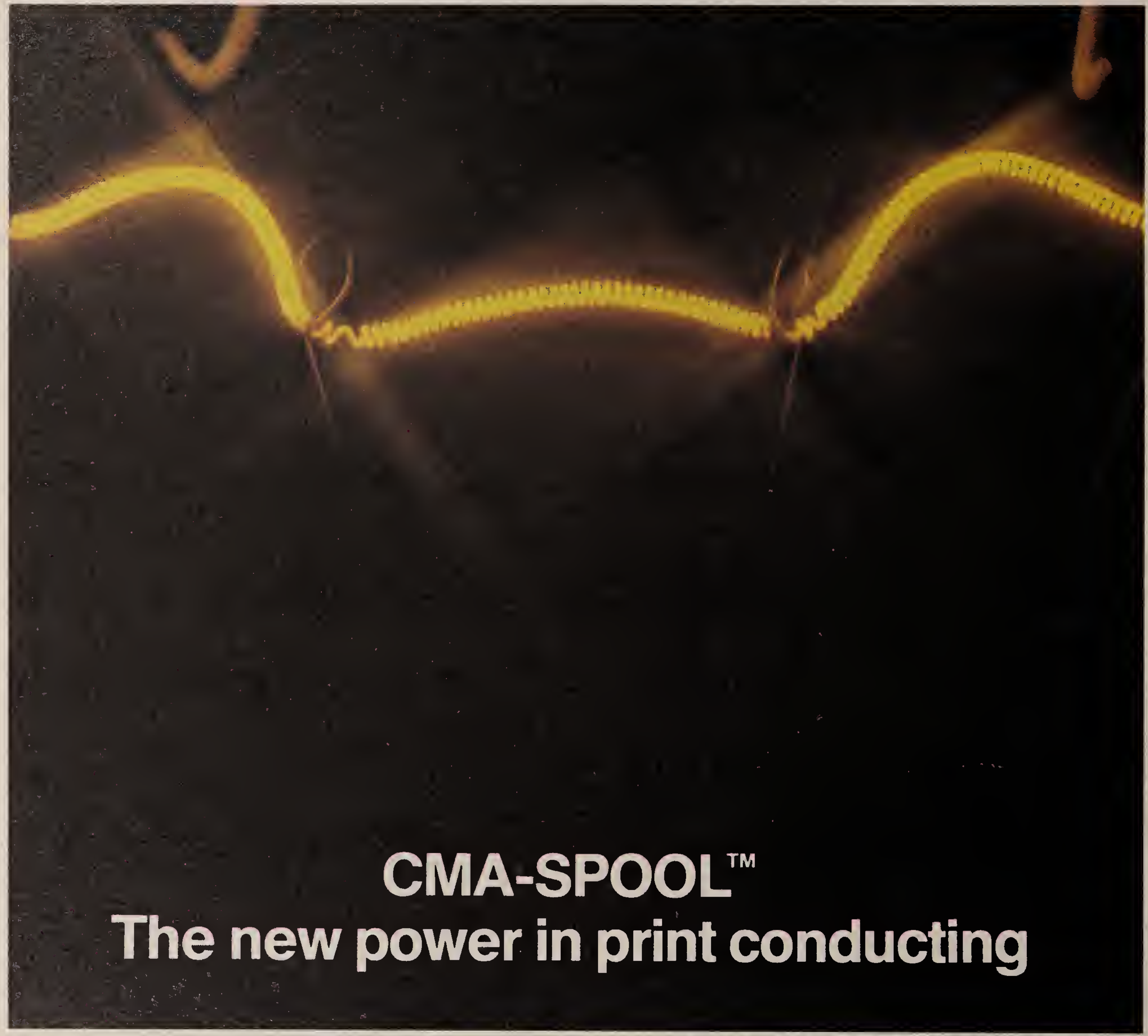
The rulings may also prompt chip companies to reenter the dynamic RAM business, says Jack Beedle, president of In-Stat, Inc. in Phoenix.

However, Motorola, Inc., which last December announced it was getting out of the 256K-byte dynamic RAM market, says it will continue to evaluate the market before making a decision on the dynamic RAM production.

Motorola Chairman Robert Galvin was one of several chip executives who recently participated in a private meeting of both Japanese and American firms in Los Angeles to discuss the trade issue.

While the meeting resulted in some healthy discussions between the two groups, some industry representatives say they prefer the regulatory approach to solving the trade issue.

"The Department of Commerce rulings not only add political pressure to the 301 case, they also have the substance of law," says Michael Maibach, government affairs manager at Intel Corp.



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Primed for success: Prime Computer marks prosperous 1985

CEO says firm took calculated risks

By Donna Raimondi

NATICK, Mass. — Prime Computer, Inc. had a very good 1985 and plans on repeating history in 1986, President and Chief Executive Officer Joe M. Henson said recently.

He was explaining to the press why his company blossomed in 1985 when most other minicomputer companies wilted.

Henson quietly reveled in the 1985 figures he presented at a quarterly meet-the-press gathering. In a year that saw many competitors slip badly, Prime's revenue increased 20%, and its after-tax profit margin was 7.5%.

Computer Industry section begins on page 166.

"Prime's strategy doesn't have a lot of pizzazz and glitter," Henson said. "But it's nice to talk about wins."

There were other signs of a positive year: Prime increased its sales force by 20%; upped its research and development portion to 10.6% of revenue, or 28% over the 1984 rate; and added 800 employees worldwide.

The secret to success? "We take risks," Henson said in answer to charges he said the press makes that the company does not take risks. "But they are calculated and appropriate risks. We are awfully careful in the way we monitor what we're doing. But success is measured by the reults you achieve, not the risks you take."

Apparently that is true. Seventy percent of Prime's 1985 sales came from previous Prime owners, and 900 new customers came on board during the year.

"This 70% shows a strength in the customer base that other mini companies don't all have," said Carol Muratore, vice-president at Prudential Bache Securities, Inc. Muratore said that Prime customers are attracted to the flexible operating system that makes the systems easy to program, to the Medusa computer-aided design and manufacturing (CAD/CAM) package and to the heavily discounted prices.

She also noted that Prime writes a high list price and then sells at a discount, as opposed to companies like Data General Corp. that write a low price and do not discount.

Another reason for Prime's success lies in its primarily end-user-directed sales force, Muratore said. The other minicomputer makers tend to have a higher OEM content to their sales, she said, which causes them to fluctuate more.

Prime's fourth-quarter 1985 revenue of $209.9 million broke the $200 million barrier for the first time. Henson said the results reflected strong worldwide demand and a weakening U.S. dollar. Prime's sales were 53% domestic and 47% international in 1985.

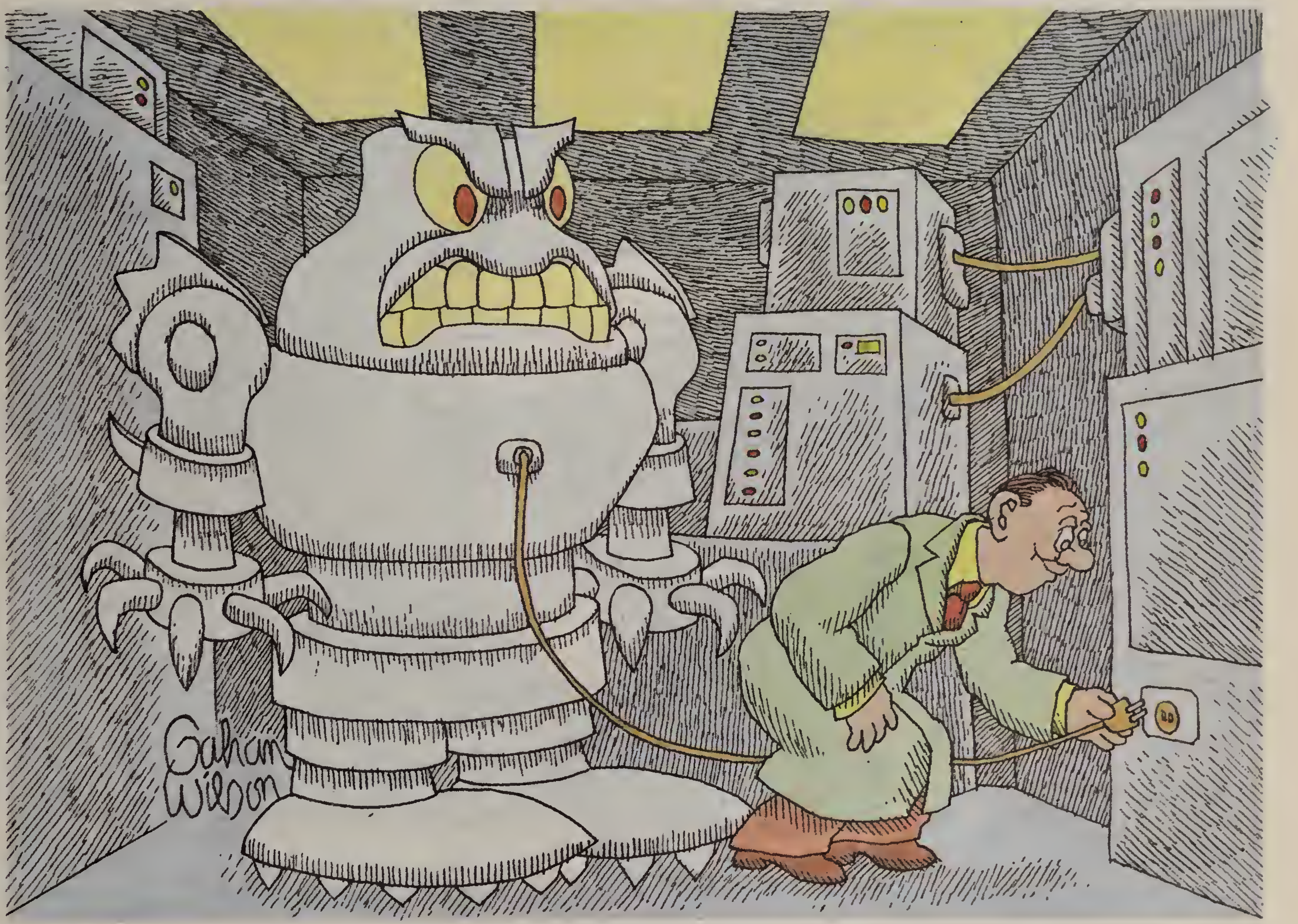
Indeed, the European market was strong in 1985, and Prime is more heavily tipped to Europe than the other minicomputer vendors, Muratore said. Most U.S. minicomputer firms have a about 35% to 45% non-U.S. sales, she added, so Prime's 47% was a factor in its success.

Net income for the fourth quarter was up 18% to $17.5 million, and profit for the year rose to $57.8 million. Prime repurchased $9 million of its own stock in 1985.

The company also increased its channels of distribution in 1985. Programs for value-added resellers, value-added distributors and OEMs were added to Prime's original authorized distributor program, adding 36 alternate sale channels. Last week, Prime announced a $5 million reseller agreement with plastics industry software and systems supplier D-M-E Co. of Madison Heights, Mich.

Prime must do this to grow, Muratore said, but

See **PRIME** page 142



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HP resumes full pay, time

PALO ALTO, Calif. — Anticipating increasing orders over the next year, Hewlett Packard Co. recently announced the restoration of full pay for some employees and full-time work schedules.

As a result of falling order's, last summer HP ordered its workers to take two unpaid vacation days each month.

Pay cuts ranging from 5% to 10% were also implemented.

Managers recently were given the option of bringing their departments to full staff and full pay.

Under the new plan, only 1,000 of the company's top managers will be subject to 5% to 10% pay reductions, according to a company spokesman.

Pyramid, Hyundai sign 3-year deal

MOUNTAIN VIEW, Calif. — Pyramid Technology Corp. recently announced the signing of a $10 million, three-year contract with Hyundai Electronics Industries Co. of South Korea.

Under the first phase of the pact, Hyundai gains the right to distribute Pyramid's family of Unix-based, reduced instruction set superminicomputers in South Korea.

Phase 2 includes Pyramid granting certain manufacturing and additional distribution rights.

Beyond Korea, the deal further opens up the Pacific basin for Pyramid as the company moves to expand into the international marketplace.

Last November, Pyramid signed a $10 million distribution agreement with Sharp Corp. of Japan and in July inked a $35 million distribution pact with Nixdorf Computer AG of West Germany.

Hyundai markets a line of Unix-based products, including micros, workstations, networking and communications products and vertical market software.

— Eddy Goldberg

Teknowledge goes public

PALO ALTO, Calif. — Artificial intelligence software company Teknowledge, Inc., in its recently announced initial public offering, raised more than $28.3 million earlier this month.

Stock was offered at $13 a share and closed at the same price, with the company netting $24 million from the sale of two million shares. Stockholders sold another 180,000 shares.

The 5-year-old firm designed and sells S.1 and M.1, knowledge-base system development tools that it said have been licensed to more than 175 customers since their introduction in June 1984. Teknowledge said it plans to use proceeds of the stock sale to pay debts and finance product development and acquisitions.

Teknowledge has roots at Stanford University, the former research environment of several of its employees. Former Encore Computer Corp. principal and Digital Equipment Corp. veteran C. Gordon Bell is the founder of Teknowledge, and Lee M. Hecht is chairman of the board, president and chief executive officer.

— Peggy Watt

Prime marks prosperous '85

From page 141

added that the new distribution channels are too new and too small a part of Prime to be able to forecast whether they will help the company in 1986.

The company has focused on high-growth vertical markets, especially CAD/CAM in the scientific area and data base management in the commercial arena. Each of those categories accounts for half of Prime's business, said Stephen Kiely, vice-president of systems marketing and development.

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Stratus preserves corporate access

From page 166

System/36, 4300 and possibly 8100 lines, knocking out Stratus as a supplier.

But Stratus Product Marketing Vice-President Nicholas J. Bologna, the key architect of the OEM deal with IBM, believes the market can accommodate both vendors.

'We can share that business'

"It's inevitable that we compete with them," Bologna says. "In the largest accounts, they are stronger in DP than we'll ever be. But we can share that business; more and more customers are going to multiple sources."

In a curious move, IBM recently shifted responsibility for the System/88 from its Systems Products Division to its Communications Products Division, prompting speculation that Big Blue will reposition the system for communications applications such as a front-end controller. The shift will have little effect on the Stratus relationship, Bologna says.

"I spent 13 years at IBM, and I didn't know where the products were coming from," he says. "The product group is the same; it just reports to a different boss. We haven't seen any change at all."

The System/88 did not become commercially available until last month, and IBM is already gearing up its famous aggressive marketing strategy for it. "They have instituted some special marketing programs and offered bonuses for salespeople and branch managers who sell it," says fault-tolerant industry analyst Omri Serlin of Itom International in Los Altos, Calif.

Bologna

But Stratus' success, at least so far, seems beyond question. With its 1985 sales up 90% to $80.1 million and profits up 59% to $8.6 million, it has quickly become a major thorn in the side of fault-tolerant pioneer Tandem Computers, Inc. It has also left fellow transaction processing start-ups like Synapse Computer Corp., Sequoia Systems, Inc. and Parallel Computers, Inc. far behind.

"Stratus is the only start-up to address this marketplace that has come anywhere near its goals; there have been so many failures," Serlin says.

Now Stratus is faced with the transition to Foster's original business goal as a major computer company.

Shipments of transaction processing systems will increase by 14% annually through 1990, according to International Data Corp., and Foster predicts that industry heavyweights like Data General Corp. (Foster's former employer) Digital Equipment Corp. and Hewlett-Packard Co. will soon be looking for a piece.

"I prefer them coming into the market we understand best, rather than us trying to go against them," he says. "We're well positioned, as long as our engineers don't assume it's impossible for someone else to catch up."

The 42-year-old Foster has been dubbed "the Abe Lincoln of the computer industry," and not only because he dwarfs President Ronald Reagan in a handshaking photo displayed in Foster's corner office. One of his chief concerns is maintaining the accessible culture of a start-up as Stratus swells past 800 employees.

"You solve that by effective delegating," he says. "We have a lot more managers in the company now, but they've made the transition from being doers very well, partly because many were managers in large computer companies before they came here. I don't think we have the problem of insulated management here, but one of my jobs is to spend a lot of time seeing that we don't."

EXECUTIVE CORNER

Prime Computer, Inc. recently named **Vladimir Geisberg** vice-president of computer-aided design and manufacturing engineering, reporting to **Andrew C. Knowles**, corporate vice-president of the CAD/CAM workstations and terminals group.

Geisberg is responsible for the development and quality assurance of Prime's CAD/CAM application software packages for the mechanical, architectural, engineering and construction marketplaces.

■

Silvar-Lisco announced the election of **Paul F. Seckendorf**, president and chief executive officer, to the additional post of board chairman.

Seckendorf, 51, joined Silvar-Lisco in January of 1984 as president and chief operating officer. He was elected a director in February 1984 and chief executive officer in August 1984. Prior to joining Silvar-Lisco, Seckendorf was vice-president and general manager of the International Division of the Calcomp Group of Sanders Associates, Inc. Seckendorf succeeds **William M. vanCleemout**, who resigned as chairman and director in January.

■

Zenith Electronics Corp. has named **Hoy Y. Chang** president of Zenith/Inteq, Inc., a wholly owned Zenith subsidiary based in Herndon, Va. Chang will have direct responsibility for all Zenith/Inteq operations, including the design and marketing of Tempest high-security micros and peripherals. He succeeds **Winfree P. Tuck**, who resigned Feb. 28.

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SUPERSHORTS

Apple Computer, Inc. will construct a $12 million manufacturing, distribution and service facility in Singapore. Construction will begin immediately, with completion scheduled for July 1987. The plant will produce Apple IIe computers.

■

A restructuring of **Sperry Corp.**'s Information Systems Commercial Marketing organization was announced recently.

The Commercial Marketing organization employs approximately 17,000 people and covers marketing in the U.S. and in all other countries where Sperry does business.

The new organization is intended to increase the focus, efficiency and flexibility of the line marketing divisions, strengthen vertical industry marketing and make more effective use of both management and staff resources. International business will be given more attention and support through the establishment of separate entities for Europe, the Pacific/Americas region and Japan.

■

AT&T and **Quotron Systems, Inc.** have signed three contracts that formalize their joint association to market an advanced new system for the financial services market. The contracts, which do not provide for any equity participation on either side, are in the areas of development, marketing and operations.

■

Computervision Corp. announced that it has agreed with **Metheus Corp.** of Hillsboro, Ore., to transfer to Computervision the activities of the joint venture that was created between itself and Metheus in 1984.

The company said the joint venture, called **Metheus-CV, Inc.**, will become part of the Computervision mainstream organization with the transfer of its technology and employees to Computervision. It plans to retain all employees at the Hillsboro location.

■

Icot Corp. announced that it has signed an agreement with **IBM** to develop a custom communications product. The initial agreement is valued at about $2 million. Icot is a manufacturer of data communications equipment including workstations and terminals.

Happy days are here again

From page 166

losers. The winners were the users who sat on their hands waiting for the prices to come down. The winners were also IBM shareholders, who finally saw IBM doing something meaningful to reduce its huge inventory.

The losers were obviously the 500 or more users who took delivery of their 3090s prior to Feb. 11, not to mention the thousands of late 4361, 3080 or 4381 buyers. The losers were also those industry pundits who said that IBM was not about to slash prices since the market was no longer responsive to price elasticity.

On balance, the benefits from IBM's latest announcement outweigh the losses. What's good for a computer user must be good for his company, state, country and so on up the line.

In the long run, however, even the surviving IBM competitors will benefit.

Computer Industry section begins on page 166.

Lower prices tend to increase the usage of, and therefore the demand for, computing power. The economists call this phenomenon the price elasticity of demand. The greater the demand, the more opportunities there will be for IBM competitors and not just IBM itself.

But don't figure on that happening very soon. It will be many moons and more price cuts before the industry's growth picks up again. When it's all over, IBM will be much better positioned for solid growth later in the decade. For some of IBM competitors, however, such a wait may be too long. They may no longer be around when the industry rejuvenation takes place.

'A first step'

An ancient Chinese proverb says, "A thousand-mile journey begins with a first step." Last month, IBM took that first step and provided badly needed stimulus to the industry.

After years of largely ignoring the problems that resulted from their overestimation of demand, IBM management has finally started to face the reality of the situation. And the reality is that a fat person has to stop feasting for a while if he is to have a chance to work off the excess weight — or in IBM's case, reduce the inventory.

That may sound like commonsense advice to most reasonable people, especially those who have no weight problems. The fact that IBM is starting to act once again in line with common sense is good. It's good for IBM. It's good for its users. It's good for forecasters who possess common sense. In the long run, it will even be good for the best of IBM competitors.

For all those reasons, Feb. 11 was a very special day — the day the buyers' market, until then only a prophecy of the few, became a reality for all users. To borrow a chant that kept the spirits up during the Great Depression: "Happy days are here again!"

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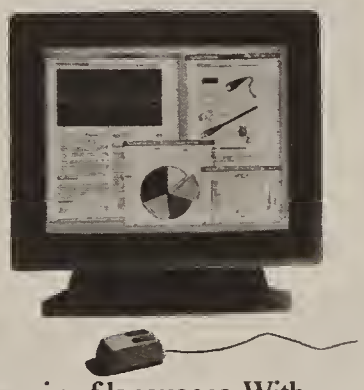

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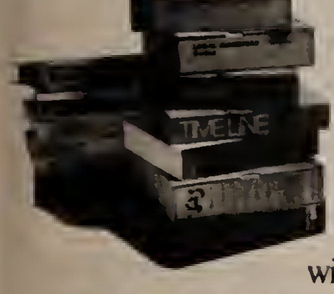

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COMPUTER INDUSTRY

Proposed Calif. tax change fuels contract staff dispute

By Jeffry Beeler

SACRAMENTO, Calif. — Many California user organizations that now employ contract programmers in large numbers may soon find themselves in a serious financial bind, according to critics of a proposed change in state tax regulations.

On one side of a budding controversy over the proposal stand California's MIS professionals, some of whom warn of dire consequences for contractors and clients if the proposed state ruling ever becomes law.

On the other side stand officials of California's Employment Development Department (EDD), which downplays the threat and views the proposal as an innocuous change to existing state regulations governing employer-employee relationships.

Unlike staff programmers, contractors usually receive only a straight hourly wage and forgo most standard fringe benefits like pensions, profit sharing, paid vacations and group medical insurance. The absence of such benefits entitles independent programmers to substantial tax deductions that, in effect, deplete state coffers.

To prevent contractors and their clients from unfairly depriving California of that tax revenue, the EDD long ago began subjecting large-scale employers of contract programmers to periodic audits. But under the proposed regulation, many programmers that have regarded themselves as independents could soon be reclassified as employees against their will, according to Guy Scharf, former president of the Northern California chapter of the Independent Computer Consultants Association.

For every contract programmer whose employment status EDD auditors redefine, a client becomes potentially liable for up to three years worth of back taxes, penalties and interest, Scharf says.

Fear of possible back-tax assessments could persuade many large California corporations to adopt internal policies flatly forbidding the hiring of contract programmers. The state's revised regulation could theoretically drive many contractors out of business by forcing them to become single-company employees, Scharf says.

EDD auditor Jerry Hicks, however, disputes Scharf's interpretation. "The proposed changes to our regulations are not new rules," Hicks says. "They merely restate the existing common law we've always used to determine employment relationships."

Hicks says the changes may even save employers money and otherwise benefit them by clarifying the guidelines differentiating contractors from staff members.

The key test in winnowing contractors from staff members is whether a client controls the "manner and means" by which programmers produce their finished results, Scharf says.

But the proposal also lists some secondary tests that further contribute to the classification process. If, for example, a contractor differs substantially in technical skills from the MIS professionals on a firm's payroll, the individual stands a good chance of being categorized as an independent. If, on the other hand, the same contractor is required to comply with a client's internal policies and procedures, the programmer runs an increased risk of being labeled as an employee.

By itself, no single test constitutes definitive proof of either independence or employment, Scharf says. To classify a programmer for tax purposes, the EDD will examine each set of test results as a whole, decide where the preponderance of evidence lies and then rule accordingly.

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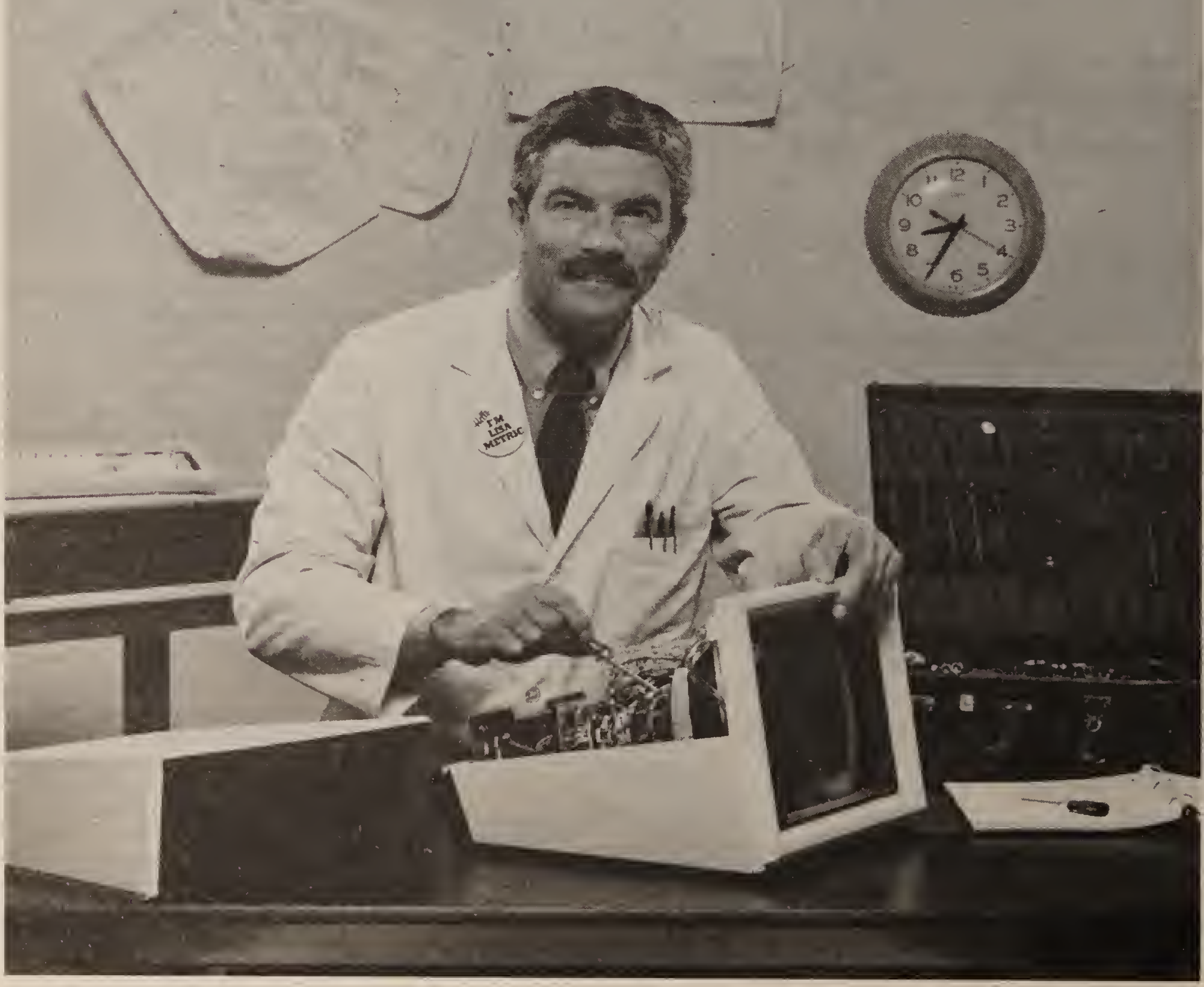

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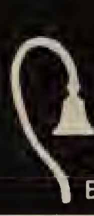

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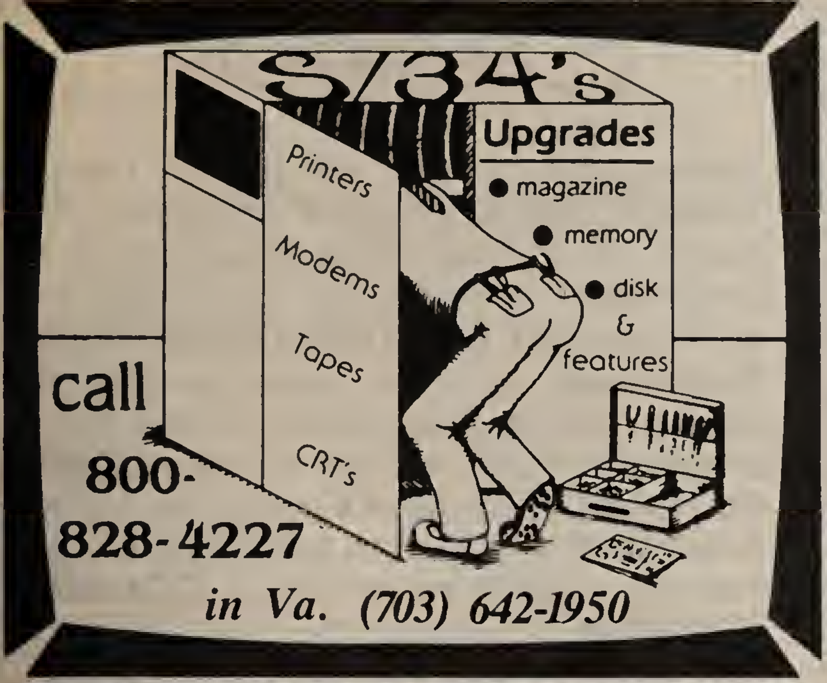

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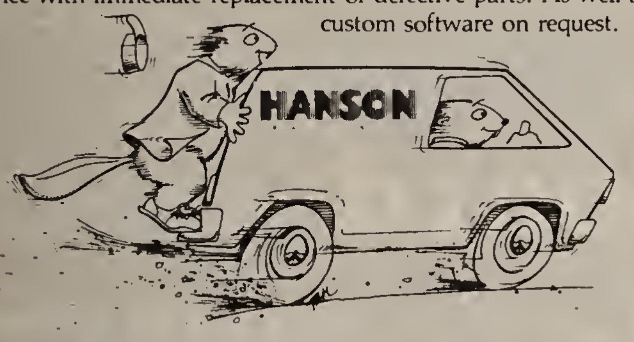

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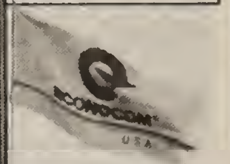

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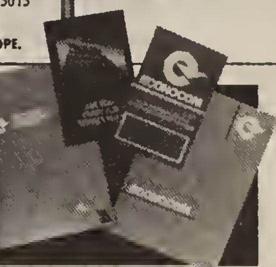

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350 N Sunnyslope Rd , Suite 350
Brookfield, Wisconsin 53005 (414) 797-8855
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Scottsdale, Arizona 85251 (602) 274-6666
PITTSBURGH: Mortell, Liguore & O'Brien, Inc
P.O. Box 836
Allison Park, Pennsylvania 15101 (412) 487-5153
SAN FRANCISCO: The Computer Resources Group, Inc. Agency, 303 Sacramento Street
San Francisco, California 94111 (415) 398-3535
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National Computer Associates

SYSTEMS PROGRAMMER

The Sloan School Computer Facility seeks systems programmer to provide primary systems support (software installation, documentation, and consultation) for the following small computer systems and their operating systems:

1. Xerox workstations using Star, Xerox Development Environment, and Interlisp-D.
2. IBM RT PC's and AT&T 3B2's using versions of Unix.
3. IBM PC XT's using PC-DOS. Each of the above will require coordination with faculty and staff in order to see that the machines are used most effectively.

Individual will also serve as a small system resource to the Sloan School as a whole in questions of software, and will attempt to provide solutions to individual problems in such a way as to promote a network-wide level of coherence between disparate systems.

Qualifications include BA or equivalent and several years' programming experience. One year's programming experience using at least one of the following operating systems: PC-DOS, Unix, or Interlisp-D as well as one or more high level languages such as REXX, C, FORTRAN, PASCAL, or LISP. Ability to work with and communicate well with both novices and experts. Facility to learn new things quickly and adapt to rapidly changing technical environment.

Send two copies of resume to Sally Hansen, MIT Personnel Office, E19-239, 77 Massachusetts Avenue, Cambridge, MA 02139, Attn: Job No. A86-691.

MIT is an equal opportunity/ affirmative action employer.

MIT

SR. PROGRAMMER/ ANALYST

IBM/RPG III

Vinnell Corporation, a leading technical services corporation located in Fairfax, VA has an immediate opening for a Sr. Programmer/Analyst. The successful candidate will evaluate, design, write, test, and document multiple computer applications on an IBM 38 using RPG computer language.

Qualifications include a Bachelor's degree in business and/or computer science and 3 years experience in EDP systems analysis and programming, one year of which must have been with an IBM System 38 with RPG III.

We offer a competitive salary and benefits package. If interested, please forward your resume including salary requirements to Dept. SP, Vinnell Corporation, P.O. Box 902, Fairfax, VA 22030.

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U.S. Department of Commerce Bureau of the Census

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Dave Mitchell

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(813) 796-6907

SYSTEMS ANALYST

New Mexico State University is seeking candidates for the position of Systems Analyst. This position provides consulting and programming services in the Large Systems Computing Systems support area One or two years of experience as Programmer or Programmer Analyst required. Knowledge of large scale IBM systems and their implementations (i e. MVS/JES3 or VM) with some familiarity of mini computer systems such as UNIX or VMS preferred. Demonstrated leadership and self starting abilities are a must. Bachelor's degree in Computer Science, a scientific discipline, Business Administration, or related area preferred An acceptable substitute would be wide experience in the data processing field with continuing work towards an appropriate degree. Extensive familiarity with computers and languages is required. Salary: $25,000 - $30,000 annually. Liberal benefits include 22 days of annual leave per year NMSU has an excellent computer related degree program with tuition benefits. Interested candidates should send resumes to Taryn Westergaard, NMSU Computer Center, Box 3AT, Las Cruces, NM 88003. Application deadline is April 8, 1986 MINORITIES AND FEMALES ARE URGED TO APPLY

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SENIOR ANALYTICAL SYSTEMS ENGINEER wanted to design and develop software for use on the DEC VAX hardware system for manufacturing and production applications; analyze existing production software systems and recommend modifications to improve efficiency; design program logic to implement processing changes; implement and analyze new software systems in accordance with client specifications. Requires M.S. degree in Computer Science or Electrical Engineering and six months related experience as an Electrical Systems Engineer: $27,500.00 per year; 40 hours per week Send resumes to 7310 Woodward Ave., Room 415, Detroit, Michigan 48202. Ref. #49485 "Employer Paid Ad"

Senior Research Statistician to design, develop, validate, document and maintain software for the latest statistical methodologies. Specialization in survival analysis and multivariate analysis with concentration in statistical discrimination necessary. Ph.D. in Biostatistics/Statistics/Computer Science and 2 years PL-1 or C Programming experience or equivalent computer science education. Salary: $33,000. Contact the Job Service Office at 700 Wade Ave., Raleigh, NC or the Job Service nearest you. Refer to Job Order #NC5132656.

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In addition to an ideal California location convenient to coast and mountains, Sutter offers a competitive salary and comprehensive benefits package Please send resume and salary history in confidence to:

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EOE/M/F/H

COMPUTER PROGRAMMER/OPERATOR

IMMEDIATE OPENING

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This position offers an excellent opportunity for professional advancement. Salary in mid 20's. Please call Theresa Clyde at (212) 563-5360.

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Assist in directing the design and integration of program products; coordinate the implementation of changes in the technical environment that affect computer services, software development and systems communications, work to meet user needs for new and modified systems and provide staff support with computer planning and development activities. Requires Bachelor's degree in computer science or related field and 5 to 7 years of effective experience in information handling. Apply to box (24) at address listed below.

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Coordinate research, development and testing of database-oriented Interactive systems and integrated personal computer work station software; research technical alternatives; and support establishment and review of system standards. Requires Bachelor's degree, or equivalent, in computer science, plus 4 years of effective experience, preferably in information systems and database applications. Apply to box (25) at address listed below.

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Define and formulate needs; devise solutions; prepare systems specifications, Analyze system and program logic, verifying with test data; recommend and make revisions; test and debug programs. Prepare documentation for operation and maintenance of systems. Requires Bachelor's degree, or equivalent, in computer science, plus 3 to 4 years of effective experience in computer programming and analysis, preferably in information systems. Apply to box (26) at address listed below.

THE PENNSYLVANIA STATE UNIVERSITY · 1855 ·

Send letter of application, resume and salary requirements to: **Employment Division, 117 Willard Building, Box (# corresponding with position above), University Park, PA 16802. Application Deadline: 4/11/86.**

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Supporting our international marketing stronghold, you will work closely with our Marketing Department to design major new FOCUS-based systems. To accomplish this, you will need at least 4 years of progressively responsible systems development experience, utilizing FOCUS in an MVS/TSO environment. Exceptional interpersonal skills and experience in prototyping systems are desired.

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In this creative and technically challenging position, you will work closely with our Customer Information Systems Department to develop on-line database systems using COBOL. This leadership position requires extensive experience in a COBOL/MVS/CICS environment, and effective analytical skills.

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CTG

EOE

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We are seeking an individual who can develop these new programs (perfect the curricula, integrate the programs where appropriate, gain resources to support the programs, attract faculty, market the programs) and evaluate the possibility of future programs in this broad area. We seek applicants who combine significant academic credentials, college or university teaching experience and business experience, and who give evidence of leadership, creativity and vision. We will consider applications from individuals whose primary experience is either in academia or in business. Closing date for applications is April 15, 1986 The successful candidate should be prepared to assume responsibility by August 15, 1986 at the latest

Candidates should include a letter of application addressing itself to the specifics of this position and a vitae. Applications should be sent to: **Dr. James F. Reid, Vice President for Academic Affairs, College of St. Thomas, P.O. Box 5019, 2115 Summit Avenue, St. Paul, Minnesota 55105.**

Those wishing more information about the programs before applying may call (612) 647-5415.

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COMPUTER FACILITY DIRECTOR/SYSTEMS ANALYST

U.S. Dept. of Commerce Bureau of the Census

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375 Cochituate Road
Box 9171
Framingham, MA 01701-9171

CBasic Software Programmer

Ætna Life & Casualty has an opening for an experienced CBasic Software Programmer to work at our Windsor, CT facility on a commercial processing system project that will provide each Field Office with a local area network for processing policies.

Major responsibilities include technical support for IBM-PC application development area, evaluation of PC hardware/software, problem diagnosis and resolution, and support of local area network hardware/software.

Successful candidate must have three to five years of CBasic programming experience and ability to plan/design applications. Knowledge of IBM-PC internals/externals and DOS 2.0 or 3.0, and an ability to program Assembler and IBM-BASIC required.

Ætna offers a highly competitive salary, generous benefits package and relocation program. Please send your resume to Ray Brothers, Recruiting, Dept. 0474, Ætna Life & Casualty, 151 Farmington Avenue, Hartford, CT 06156 or call him at 203-273-4008. Ætna is an equal opportunity/affirmative action employer.

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FRANK E. BASIL, INC. is an international company with a 25-year record of success in the Middle East. Our current project provides technical services and training to the Royal Saudi Naval Forces (RSNF) and the opportunity for an experienced Computer Professional to engage in a challenging overseas experience.

We have an opening for a high-level Computer Professional to manage our DP department. This position requires a BS degree in Computer Science with experience in the following:

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- **MVS**
- **TSO/SPF**
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For immediate and confidential consideration, please send your resume to: Lou Canterbury, FRANK E. BASIL, INC., 1510 H Street, NW, Dept. RSNF, Washington, DC 20005. An equal opportunity employer. U.S. Citizenship required.

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(609) 667-4488

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From outside New Jersey, call toll-free 800-222-0153

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DATA PROCESSING OPPORTUNITIES

The Warner-Lambert/Parke-Davis Pharmaceutical Research Division is seeking results-oriented individuals to fill the following key data processing positions:

COMMUNICATIONS SOFTWARE SUPERVISOR

Responsibilities will include the planning and installation of a rapidly growing sophisticated telecommunications network linking our scientific research environment with Corporate Headquarters in New Jersey. This will require the use of state-of-the-art technology to advise users, troubleshoot problems, make operationally sound and cost effective equipment recommendations and insure the efficient installation of network components.

Qualified applicants will evidence:

- Bachelor's degree or equivalent in Data Processing, Engineering or a related discipline
- Minimum of five years experience with large mainframe equipment using IBM protocols including SNA, NCP, NCCF, and VTAM
- At least three years experience in a teleprocessing supervisory/planning capacity
- Excellent communication skills

SYSTEMS PROGRAMMER

Primary responsibilities will include installation, testing and implementation of existing software packages; MVS/JES2 maintenance and enhancement.

Qualified applicants should have:

- Bachelor's degree in business administration, mathematics or computer science or completion of technical education in operating systems and related work experience
- Four to five years experience in large scale data processing, systems or operating system implementation
- Ability to code FORTRAN, PL/1, COBOL and/or SAS
- Excellent communication skills

MINI/MICRO SPECIALIST

Primary responsibilities include computer applications development and enhancement in a distributed system environment.

Qualified applicants should have:

- 4 years experience in applications programming or technical support
- BS or BA degree in Computer Science or equivalent
- Experience with HP-1000, IBM PC and/or DEC VAX hardware using Fortran, C, DBASE software tools
- Experience with mini/microcomputer hardware interfacing for scientific laboratory data acquisition
- Familiarity with IBM mainframe TSO, JCL, PL/1 helpful

SENIOR SYSTEMS ANALYST/ SYSTEMS ANALYST

Responsibilities will include assisting in the design of computer systems, developing new systems, and maintaining/enhancing existing systems.

Qualified applicants should have:

- Minimum 4 years experience in applications development
- Ability to interact effectively with others
- Excellent written and oral communication skills
- Ability to work independently in pursuit of major objectives with little supervision
- B.S. degree in Computer Science, math or other technical discipline or equivalent experience
- IBM 30XX MVS, TSO/ISPF, and database experience
- PL/1 experience
- Though not required, experience with INQUIRE, SAS, Text, IBM PC, C, ISPF Dialog Manager, and graphics is a plus

Qualified candidates (principals only) should forward resume (Please indicate position of interest) and salary requirements in confidence to:

Ms. Laura Alberts
Human Resources Representative
Pharmaceutical Research Division
2800 Plymouth Road • Ann Arbor, MI 48105

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Computer Information Systems Plymouth State College

Applications are invited for a tenure track faculty position at the Assistant Professor level beginning Fall, 1986. Teaching responsibilities include upper level and introductory courses for CIS majors, and a general education course for non-majors. Computer facilities include a Pyramid 90X and PDP 11/70 using UNIX, a microcomputer lab and a laboratory for programming courses. The department has a full-time staff of five faculty supplemented by lecturers

The Plymouth area is located at the base of New Hampshire's White Mountains minutes from the Lakes Region, and is a major recreational center for the Northeast. Plymouth State College enrolls 3200 undergraduates in a wide variety of programs and is a major cultural focus for central New Hampshire

Minimum Qualifications: a masters degree with a CIS concentration, experience in systems analysis and design, experience, aptitude and interest in undergraduate teaching Send resume transcripts and 3 letters of recommendation to: **Dr. William J. Taffe, Department** of **Computer Science, Plymouth State College, Plymouth, New Hampshire 03264, (603) 536-1550** Ext. 530 Recruiting will continue until position is filled and applications review will begin April 1, 1986 Plymouth State College is an AA EEO Position is contingent on final approval of funding

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DATA PROCESSING MANAGER

Headquarters of national company located in southwest Connecticut seeks experienced manager to run its Data Processing Department. Qualifications enhanced by exposure to PRIME hardware and PRIMOS operating system, PRIMENET networking software, data communications, network planning and analysis, and management experience. Background experience in business application development in FORTRAN and RPG rather than computer operations necessary We offer excellent working conditions and benefits and a competitive salary Interested applicants should reply in confidence to the Human Resources Manager

Reply to CW-B4766
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Application Programmer Analysts

Your energy and expertise will make an impact at Florida Power Corporation! We're relied upon by over 3 million residents of Northern and Central Florida for safe, efficient energy. Our customer base is rapidly growing, and to ensure our leading position, we are seeking talented Application Programmer Analysts to make a significant contribution to the systems behind our energy network.

These positions call for a Bachelor's degree and 2-6 years of relevant computer systems design and programming experience. A knowledge of ANS COBOL, IBM OS/VS JCL, TSO/ISPF, CICS, VSAM and structured programming techniques is essential; a working knowledge of IDMS Data Base, SAS, Focus, DYL 280 is highly desirable. Your expertise will be applied towards participating in the analysis, design, development, implementation and support of operations information systems and programs. Strong oral and written communication skills a must.

When you join Florida Power, you can anticipate utilizing your talents and ideas fully, while enjoying the incomparable lifestyle of residing in the sunshine state. Not only is housing affordable and plentiful, but your compensation will go further with just 5% sales tax and no state income tax! Add the myriad of recreational and cultural resources, and you have the ideal environment to complement your professional success.

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Write Batch and on-line programs for manufacturing systems with user interfacing required. Working knowledge of MRP, CRP, shop floor control, inventory, and other manufacturing systems required.

Position requires a minimum of 4 years experience. Degree preferred, but not required. Work experience must include Burroughs software: GEMCOS, COBOL 74 Editor, DMSII, WFL, and CANDEE. Experience with TMS or variations of TMS a plus. 40 hours per week with some travel.

Our location offers a vast array of cultural and recreational activities with close proximity to both the mountains and beaches.

Please submit resume and salary requirements to:

Employee Relations Department

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SYSTEMS PROGRAMMER

CORNELL Computer Services is searching for experienced Systems Programmers to fill 3 newly created positions

SR SYSTEMS PROGRAMMER Design, implement, install, document and maintain networking subsystems for major IBM operating systems

SYSTEMS PROGRAMMERS: Design/implement/install/document and maintain software or significant subsystems in either VM/HPO and VM/XA-SF or MVS/SP and MVS/XA. Candidates are encouraged to apply if your experience includes at least 3-5 years in systems programming using MVS, VM/CMS and IBM Assembly language Familiarity with the following preferred VM/XA-SF, SMP/E, RSCS, JES2, and/or TCP/IP

If interested, please submit a cover letter and resume by April 10, 1986 to: Cynthia Smithbower, Dept. 101-15, Staffing Services, CORNELL UNIVERSITY, 160 Day Hall, Ithaca, New York 14853-2801

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QUALIFICATIONS: Minimum of five years' experience in hospital information systems MBA or related degree preferred with major in systems-related field Excellent communications skills

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COMPUTER OPERATIONS MANAGER

A large Boston area professional firm is seeking an Operations Manager for their Data Processing Department Primary responsibilities of this position include:

- Act as Assistant to the Data Processing Manager
- Management of all computer room operations and staff.
- Management of computer supplies and forms purchased
- Responsible for training and staff development of Operations Personnel.
- Act as liaison to the firm's various hardware vendors for negotiation/administration of all hardware maintenance agreements.

Qualifications for this position include BA/BS degree, at least 8-10 years of experience in a Computer Operations/Technical Support environment including current management experience in the Computer Operations section. Effective communications skills with both operations staff and computer systems users are required Experience in large scale VMS and Unix environment will be a definite plus

Send resumes to CW-B4765, Computerworld, Box 9171, Framingham, MA 01701-9171

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Our rapidly expanding consulting firm has need of Programmers/Analysts with 2+ years experience in the following areas:

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- **IBM System 34, 36, 38 (MAPICS, a plus)**
- **INQUIRE**
- **PRIME**
- **IDMS, IMS, TOTAL, CICS**

If you are interested in excellent salary and benefits as well as advancing your career in a stimulating professional growth environment, please send your resume in strictest confidence or call collect.

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500 Archdale Dr. Ste. 202
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Attn: Jim Wesson
(704) 527-0895

Programmer Analyst

For a Florida seventy year old company. Minimum three years experience. Responsibilities will include system design and development, program, code, test, implement, document and maintenance for on-line HP3000. COBOL, QUERY, SUPRTOOL. Send resume and salary history to Personnel, **Thompson Cigar Company, PO Box 30303, Tampa, Florida 33630.**

Multiple R & D Opportunities

Our client, a diversified California-based technical and industrial corporation, seeks outstanding R & D professionals in real-time systems design, systems integration and signal processing for defense and industrial applications. Advanced degree in Electrical Engineering or Computer Science is required. PhD preferred. Please send resume with salary history to

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Lead Accounting Programmer desired by Oklahoma City, OK public accounting firm. Will plan, schedule, update and direct preparation of programs to process accounting data, solve accounting oriented problems and present financial statements by the use of IBM personal computer equipment Debug hardware and software errors and input data into computer Bachelor degree with major in Computer Science required Knowledge of COBOL computer language required 1 year experience in job offered or 1 year experience in accounting clerk position required Will accept 6 hours of college accounting coursework in place of experience. Salary $1,300/month, 40 hour work week Contact Oklahoma Employment Security Commission, 3720 S.E. 15th St., Midwest City, OK 73110. Job Order #090709. Equal Opportunity Employer.

PROGRAMMER

Software programmer with MS Computer Science and 1 year language support experience using C, Lisp, PL/M, Pascal, and 8086/8088 assembly languages. This individual will program simulation modules for MOS chips and generate program test vectors for chip and block level. Salary for this position is $12.74 per hour. Please send resume to: Dick Hewetson #6-27, Job Service, 309 Second Avenue South, Minneapolis, MN 55401.

Business Systems Analyst - Analyze business procedures and re-design and implement computer system. Must have exp. with production control systems, inventory control systems, and computer networking. BS in either Computer Science, Physics or Math and 3 yrs. exp. $2,650:00 per month. Job site/interview N. Hollywood, CA. Send resume and ad to Linzer Products, Attn: Computer Dept., P.O. Box 9608, N. Hollywood, CA 91609 not later than April 8, 1986.

DIRECTOR, COMPUTER RESEARCH ANALYSIS; Manage and direct company's computer research operation; plan and develop methodology of operation; direct and coordinate personnel assigned to program and make necessary revisions; report to management on progress and budget of program; $45K per annum, at least 6 years experience, Baccalaureate degree Computer Science, written references and demonstrated expertise in computer research analysis; DOT 169.167-030; Qualified applicants only, mail resume to: NYS Job Service, JO #NY8005919, 97-45 Queens Blvd., Rego Park, NY 11374.

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This position requires a 4 year degree in computer science or closely related discipline. Experience necessary on VAX systems (VMS) preferably as systems manager. Must have good interpersonal and communications skills You will be responsible for maintenance of minicomputer operating systems and purchase software, management of campus data communications networks and analysis/programming functions for administrative computing Will consider applicants near graduation as of June 30, 1986. Submit letter of application with resume by April 1, 1986 to Edward M Dungan, Director of Personnel, Wittenberg University, P.O. Box 720, Springfield, OH 44501 Wittenberg is an AA/EOE Employer.

COMPUTER SYSTEMS ANALYST wanted to analyze complex computer systems; design, develop and implement computer application systems; consult user and ensure validity of results and maintenance of existing systems. Requires M.S. degree in Computer Science or Mechanical Engineering and one year experience; $28,000.00 per year; 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit, Michigan 48202. Ref. #56485. "Employer Paid Ad".

ACADEMIC USER SERVICES COORDINATOR. RESPONSIBILITIES: Documentation, consult with faculty users; train and supervise student monitor/consultants, introduce students to statistical packages, graphics, text processing and general computer use. BACKGROUND: Experience in academic computing, mainframe and micro-processors; good interpersonal and communication skills; advanced degree in an academic discipline preferred COMPUTING SYSTEM: DECSystem-1091 and VAX/780-UNIX, serving 120 terminals, 10 Rainbow/Graphic terminals and several other PC's. SALARY: Based on education and experience. APPLICATIONS: Send resumes by March 31 to: Myron Curtis, Director, Computing Center, Bowdoin College, Brunswick, Maine 04011 EOE/AAE.

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SYSOREX INTERNATIONAL, a California corporation, is a systems management company developing a new computer center in Riyadh, with dual IBM mainframes and a telecommunications network of IBM PC workstations, using interconnected local area networks, has the following opening:

SR. SYSTEMS ANALYST/DESIGNER

5-8 yrs. IBM mainframe exp. in the design and development of telecommunications systems using structured methodology. Microprocessor and communications technical support exp. is also required.

The ideal candidate is a self-starter, willing to learn new skills and build on his existing base so as to make a major contribution to the project.

We offer an excellent benefit package including medical, life, accidental death, disability and profit sharing plans. You will additionally receive 25 working days vacation, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

Please send resume, with present salary history, to Personnel Dept. CW-3/24, SYSOREX INTERNATIONAL, Inc., 10590 N. Tantau Ave., Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. Principals only, please.

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COMPUTER SYSTEMS ANALYST wanted to design and develop general computer data bases for various clients, maintain data base systems, and design and develop software for business applications involving production planning and scheduling using Integrated Management Systems, Data Base Management Systems II and FOCUS data bases and COBOL, ALGOL and PASCAL languages for use on IBM 3800 and Burroughs 7000 mainframes. Requires Master's in Computer Science or Computer Methods and one year experience. $35,000.00 per year, 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit, Michigan 48202 Ref #11586. Employer Paid Ad

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Software Engineers

COMPUTERPEOPLE DATA SERVICES is expanding its professional staff in our Columbus, Ohio office. We have several long-term consulting engagements with leading edge companies in central Ohio. We have immediate needs for experienced Mini/Micro Specialists to support client applications in telecommunications technology, telephony, and process control.

We require an MS degree in computer science, math, or electrical engineering and at least 2 years' practical experience. Applicable skills include:

- **C and UNIX**
- **Networking software-X.25**
- **Telephony hardware/software design**
- **Device driver experience**

We are looking for talented new employees. For additional information call Technical Service Manager at 614-895-7398, or send resume to COMPUTERPEOPLE DATA SERVICES, 2550 Corporate Exchange Drive, Suite 100, Columbus, OH 43229. An equal opportunity employer.

COMPUTERPEOPLE DATA SERVICES

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Position open for an ACP Systems Programmer/Programmer Analyst, electronic data processing. Duties include: Programming and Systems Analysis using Airline Control Program (ACP). Software maintenance and modification; building ACP diagnostics to catch systems problems; systems modification required by change in hardware; disk Input/Output (I/O) routine; resolving disk hardware changes; making tape logic changes in the Initial Program Load (IPL) portion of system; and working with ACP internals. Supervises programming staff on special projects.

Applicant must have 2 years college and 2 years experience in Airline Control Programming (ACP) environment or 4 years experience in Airline Control Programming (ACP) environment. Ability to work well in a group situation is a must. Applicant must also be familiar with CMS programming systems. Minimum salary to be $25,000 per year for a 40 hour work week, however, additional salary up to $44,000 per year will be paid if applicant possesses additional experience.

Interested applicants should contact the Oklahoma Employment Security Commission, 3105 E. Skelly Drive, Tulsa, Oklahoma 74145. Phone: (918) 749-6861. Refer to Job Order #090710.

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Heinz Nixdorf, 60

By Amiel Kornel
Computerworld News Service

HANNOVER, West Germany — Heinz Nixdorf, widely considered the patriarch of the West German computer industry, died in Hannover last Monday of a heart attack. The 60-year-old Nixdorf, who had come to Hannover for the Cebit computer trade fair, was founder of Nixdorf Computer AG, one of West Germany's most successful computer vendors.

Nixdorf began working less in the early 1980s after suffering a heart attack, and last year he transferred the executive control of the company to Klaus Luft, a Nixdorf senior executive.

Nixdorf, one of the earliest European visionaries to recognize the promise of information technologies, powered his company through 18 years of spectacular growth and constant, although moderate, profitability. From 1974 to 1985, Nixdorf registered an average annual growth rate of 25%, reaching $1.71 billion in revenue last year.

Heinz Nixdorf, Nixdorf founder

Industry observers question whether the company will be able to maintain its course after Nixdorf's death. "The company was dominated by Heinz Nixdorf through his managing style and his ethics," said the editor-in-chief of a German computer trade publication.

Nixdorf held 51% of the company's capital with the rest in the hands of the Deutches Bank. He fought a buy-out effort by Volkswagenwerk AG in the early 1980s, but industry watchers noted that his successors may have more trouble resisting takeover attempts.

Leasing firms eye strategies

From page 166

munications," said Tom Martin, president of Computer Financial, Inc. in Hackensack, N.J. "It's a natural fit — it's high-tech hard, it's leasing for the same five- to seven-year term as computers and their users are the Fortune 500."

In addition, lessors said increased lease rate competition and customer sophistication mean that their marketing has become both more aggressive and more technological. "The days of simply calling up a customer, giving a number and making a deal are over," said Jack Schevillo, executive vice-president of CMI Corp. in Bloomfield Hills, Mich. "Today that's shooting out the window and hoping a duck flies by."

Leasing is particularly slow on IBM's 3090 series machines. Users are waiting for a greater increase in functionality over the 3080 series than is currently available. Meanwhile, projections of 3090 residual values or the future resale value of the computer when its lease ends have ranged as low as International Data Corp.'s 9%.

"IBM presumably feels it can push the new hardware down the throat of the users," said Gartner Group, Inc. analyst Ulric Weill, who headed a CDLA workshop session. "That doesn't play anymore."

Proposed ITC repeal

The U.S. Congress' proposed repeal of the investment tax credit (ITC) has also slowed first-quarter business, as lessees are uncertain when the repeal will be made effective. CDLA officers urged their members to use an indemnification clause that holds the user responsible for potential legislative changes in so-called ITC-to-lessor leases.

Computer Financial's Martin, however, said that most large-system lessees already choose the ITC-to-lessee alternative, assuming the risk of ITC repeal to get a lower lease rate. "Sixty percent of our customers last year took the ITC themselves."

In other business, the CDLA board denied the membership application of Electronic Data Systems Corp.'s (EDS) Financial Services unit because of CDLA rules prohibiting user organizations. The board reasoned that many EDS contract clients also lease equipment from CDLA firms, creating a potential conflict of interest, Martin said.

CW West Coast correspondant Maura McEnaney contributed to this story.

CDC to offer software support

From page 166

To Mertz, the service is a logical extension of the hardware maintenance services that CDC has been supplying. "Our motivation is to provide our customer base with total system service," he said. After initially targeting its existing customers, CDC plans to team up with leasing firms "where it makes sense to do so," Mertz said.

Customers have three choices of services, which are priced according to the number of site visits and telephone consulting time a CDC staff member provides, Mertz said. The $6,000 package includes seven full days of service, six of which are scheduled in full-day or half-day visits. The seventh day is designed as a reserve day in the event that a major problem occurs that would not be part of the regularly scheduled visits. The customer has the option, however, to include this time in the scheduled on-site visits. The package also includes approximately one hour of telephone consulting per month.

A $12,000 package includes 15 days of on-site consulting, 12 of which are regular visits and three of which are reserve days. It also includes two hours of telephone consulting per month. The $18,000 package includes 24 days of on-site support, 18 of which are scheduled visits and six of which are reserve days.

Cashing in on high-tech market: Sell or hold?

ACTIVE ISSUES
Kathy Porteus

"When to sell?" takes on special significance for investors who have watched their technology stocks soar in this record-breaking market. How does one determine whether now is the time to cash in gains?

There is, of course, no single answer. Many financial professionals admit it is usually easier to be wrong when one sells than when one buys a stock. But by considering a number of factors, investors can better weigh their decision to sell or hold.

Derick Driemeyer, senior investment strategist with A. G. Edwards & Sons, suggests that investors consider the direction of the stock market and how much of their portfolio they want devoted to technology, given recent concerns about capital spending levels. Based on favorable market conditions, Driemeyer advises holding a stock unless you decide to take partial gains to lighten a stock's position in your portfolio, have immediate cash needs or feel nervous about an expected 10% to 15% market correction.

Beyond looking at current market and economic conditions, one should consider the individual company's performance. Paul Haagensen, senior vice-president with Putman Management Co., says at this point in the sell decision, "There is a lot of psychology in terms of what the world expects vs. what earnings you think the company can realistically achieve."

Haagensen suggests examining a company's historic trading pattern to determine the range of price/earnings (P/E) multiples in which the stock normally sells. "If the P/E range is 10 to 20 times trailing 12-month earnings," Haagensen explains, "then you would consider selling your position when the stock traded at a P/E of 19."

Mark Boyer, portfolio manager of the Fidelity Select Technology Fund, considers a company's financials. "If the stock price, sales and earnings are up, but the balance sheet is getting worse, I'll usually sell," Boyer says.

Boyer also considers the fundamentals of a company's customers, suppliers and competitors. For example, Boyer recently sold positions in several chip companies because their primary customers, computer manufacturers, have indicated softness in 1986.

As another rule of thumb, Boyer sells or cuts back a stock that everyone is currently recommending. At such times, the stock has already experienced 75% to 80% of its move, Boyer contends. "The optimum time to sell a stock is when everyone wants it," Boyer says, "just as the best time to buy technology stocks is when no one wants them." Following his own advice, Boyer recently sold his position in Motorola, Inc. and lightened his holding of Digital Equipment Corp stock.

In addition, investors must always be sensitive to the volatility of technology stocks. "It is important to sell when you detect vulnerability in a technology stock," Haagensen warns, "because if you're right, the stock price could drop 25% to 50% within a very short time."

Boyer says he also interprets a sharp upward spike in price as a sell opportunity. Then, if the price retreats, he may buy back his original position at lower prices. "A steady, gradual rise in stock price is always good reason to hold a stock," Boyer adds.

Perhaps the most often-ignored advice on when to sell is, "Avoid being greedy." Particularly with technology stocks, Boyer says, "bulls and bears make money, but pigs get slaughtered."

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Concurrent cuts staff, braces for dip

By Alan Alper

HOLMDEL, N.J. — Concurrent Computer Corp., citing continuing soft demand for its 32-bit minis, last week cut its work force and said it expects profits in the third quarter ending May 2 to decline significantly from the previous period.

Concurrent, the former data systems group of Perkin-Elmer Corp. that operates as a publicly held, majority-owned subsidiary, said it has cut its 3,100-member worldwide work force by about 7% to keep expenses in line with reduced order. Of the 200 laid off, the majority were involved with manufacturing.

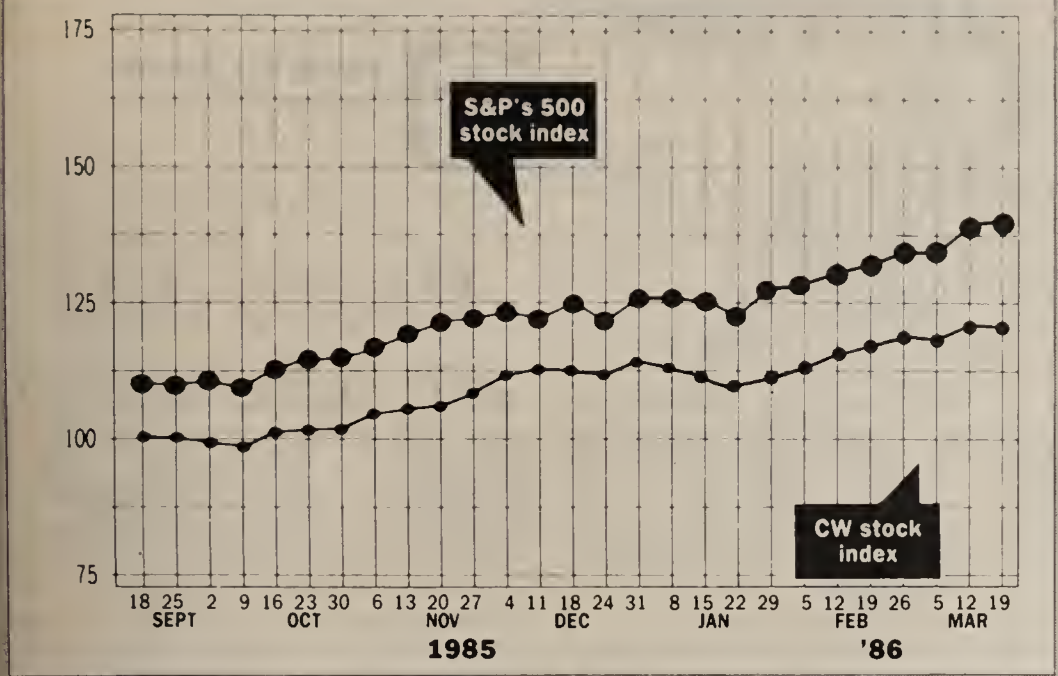
In a prepared statement, Concurrent chief executive James K. Sims attributed the lower earnings projections to softness in new orders, an industrywide condition, and a Securities & Exchange Commission (SEC) restriction that prohibited the firm from promoting its products during its three-month initial public offering period, which ended Feb. 4.

Concurent did not forecast third-quarter results but said it expected to remain profitable. In the second quarter, Conurrent earned $3.3 million, or 35 cents a share, on sales of $69 million.

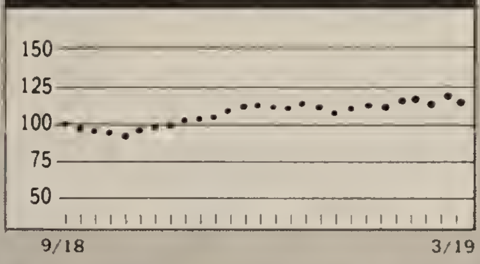
The company also said it expected demand to improve in the fourth quarter when it begins volume shipments of its Model 3280 high-end parallel processing system.

MITCHELL J. HAYES

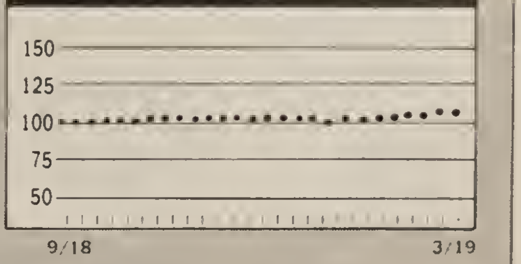
Computerworld stock trading index



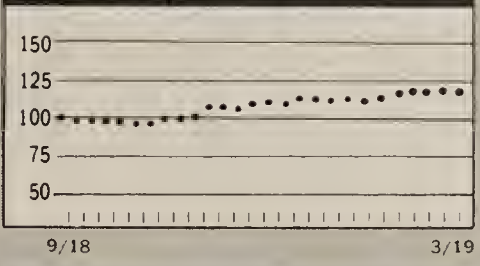
Computer systems



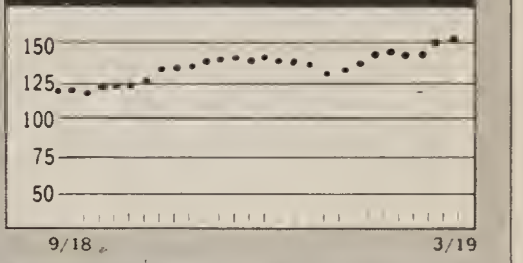
Software and DP services



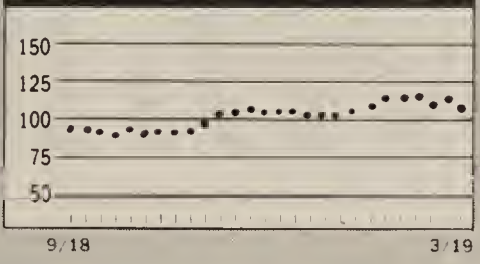
Peripherals and subsystems



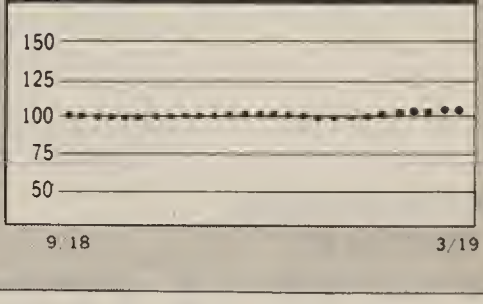
Supplies and accessories



Semiconductors



Leasing companies



All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	3/12/86	3/19/86
Computer systems	122.4	**118.8**
Software and DP services	105.1	**105.1**
Peripherals and subsystems	119.6	**119.0**
Supplies and accessories	150.9	**153.4**
Semiconductors	111.9	**109.6**
Leasing companies	104.0	**104.1**
CW stock index	118.9	**118.8**
Standard and Poor's 500 stock index	139.0	**140.9**

Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, MARCH 19, 1986

COMPUTER SYSTEMS

EXCH		52-WEEK RANGE (1)	PRICE CLOSE MAR 19 1986	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	5- 9	5 7/8	+1/8	+2.1
O	ALTOS COMPUTER SYST	9- 17	16 1/4	-3/8	-2.2
A	AMDAHL CORP	10- 18	15	7/8	-5.5
O	APOLLO COMPUTER	9- 31	15 1/2	-5/8	-3.8
O	APPLE COMPUTER INC	14- 31	26 1/2	+1 3/4	+7.0
N	AT&T	19- 28	22 3/4	-3/8	-1.6
N	BURROUGHS CORP	52- 71	64 3/8	-3 7/8	-5.6
O	COMPAQ COMPUTER CP	5- 16	15 1/4	-3/8	-2.3
O	COMPUTER AUTOMATION	1- 9	2 1/4	+3/8	+20.0
A	COMPUTER CONSOLES	5- 14	8 1/2	+1/2	+6.2
N	CONTROL OATA CORP	15- 39	25 3/4	+1 1/4	+5.1
O	CONVERGENT TECHNOL	5- 13	11 1/2	+3/8	+3.3
O	CPT CORP	5- 8	5 3/4	-3/8	-6.1
N	CRAY RESEARCH INC	25- 74	70 3/4	-2 3/4	-3.7
O	DAISY SYSTEMS CORP	11- 38	11 3/4	+1/4	+2.1
N	DATA GENERAL CORP	31- 76	39 7/8	+2 3/4	+7.4
N	DATAPOINT CORP	5- 22	5 1/2	+1/8	+2.3
N	DIGITAL EQUIPMENT	85- 167	160 7/8	-3 7/8	-2.3
A	EECO INC	13- 16	15 1/4	+3/4	+5.1
N	ELECTRONIC ASSOC.	3- 6	6 3/8	+5/8	+10.8
N	FLOATING POINT SYST	18- 37	34	+2 5/8	+8.3
N	FOXBORO	22- 31	27 1/4	0	0.0
N	GOULD INC	20- 38	27 7/8	+1/4	+0.9
N	HARRIS CORP	22- 35	29 1/8	0	0.0
N	HEWLETT PACKARD CO	29- 45	43 1/8	-1 3/8	-3.0
N	HONEYWELL INC	54- 87	76	-1/2	-0.6
N	IBM	117- 158	151 5/8	+2 5/8	+1.7
O	IPL SYSTEMS INC	1- 4	2 3/8	+1/8	+5.5
N	ITT CORP	28- 46	46	+2 3/8	+5.4
N	M A-COM INC	13- 24	17 1/2	+1/8	+0.7
N	MANAGEMENT ASSIST	2- 28	2 1/8	0	0.0
N	MATSUSHITA ELEC(ADR)	49- 74	73 3/4	+1 7/8	+2.6
O	MENTOR GRAPHICS	13- 30	14 1/2	-1 1/4	-7.9
N	MODULAR COMPUTER SYS	6- 8	7 1/2	+1	+15.3
N	MOHAWK DATA SCI	1- 13	2 7/8	+1/8	+4.5
N	NBI INC	11- 20	14 1/8	+1/4	+1.8
N	NCR	25- 46	42 3/8	-2 1/4	-5.0
N	PERKIN ELMER	22- 36	32 5/8	-2 1/8	-6.1
N	PRIME COMPUTER INC	15- 27	24 3/4	+1/8	+0.5
N	SPERRY CORP	39 59	51 1/8	-7/8	-1.6
O	STRATUS COMPUTER INC	9- 25	18 3/4	-1 1/2	-7.4
O	TANDEM COMPUTERS INC	13- 29	24 5/8	-3/4	-2.9
N	TANDY CORP	24- 44	43 3/4	+1 7/8	+4.4
O	TELEVIDEO SYSTEMS	2- 4	3 1/2	-3/8	-9.6
O	TELXON CORP	10- 28	28 1/4	+1	+3.6
N	TEXAS INSTRUMENTS	86- 132	127 5/8	+1 1/8	+0.8
A	ULTIMATE CORP	8- 32	27 1/4	-2	-6.8
O	VECTOR GRAPHICS INC	1- 1	1/8	0	0.0
A	WANG LABS "B"	15- 29	20 1/4	-1 1/2	-6.8
A	WANG LABS "C"	15- 29	20 1/2	-7/8	-4.0
N	XEROX CORP	37- 72	68 3/8	-3 1/8	-4.3

SUPPLIES & ACCESSORIES

EXCH		52-WEEK RANGE (1)	PRICE CLOSE MAR 19 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	21 35	32 1/4	-1 1/4	-3.7
N	BARRY WRIGHT	17 29	23 3/8	+1 1/4	+5.6
A	DUPLEX PRODUCTS INC	13- 22	20 3/4	+1 1/4	+6.4
N	ENNIS BUS. FORMS	14 28	27 3/4	+3/8	+1.3
N	3M COMPANY	74 104	104	+3	+2.9
N	MOORE CORP LTD	15- 25	25 1/4	0	0.0
O	STANDARD REGISTER	22- 40	39 1/2	+1/2	+1.2
N	WALLACE COMP SERVICE	30- 46	45 1/8	1/2	1.0

EXCH: N NEW YORK, A AMERICAN, P PACIFIC; B – BOSTON.
L NATIONAL, M MIDWEST; O OVER-THE-COUNTER

O-T C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & DP SERVICES

EXCH		52-WEEK RANGE (1)	PRICE CLOSE MAR 19 1986	WEEK NET CHNGE	WEEK PCT CHNGE
O	AOVANCEO COMP TECH	2- 5	4 3/8	0	0.0
N	AOVANCEO SYSTEMS INC	9- 20	19 1/4	-1/8	-0.6
N	AGS COMPUTERS INC	10- 25	23	+1/8	+0.5
O	AMERICAN SOFTWARE	9- 15	10 1/4	0	0.0
N	ANACOMP INC	2- 5	4 3/4	+1/8	+2.7
O	ANALYSTS INTL CORP	5- 11	6 3/4	+1	+17.3
O	ASHTON TATE	6- 23	23 1/4	+1 7/8	+8.7
O	ASK COMPUTER SYSTEMS	7- 25	11	-1 3/4	-13.7
B	ASTRADYNE COMP INO	1- 3	2 1/8	-1/8	-5.5
N	AUTOMATIC DATA PROC	35- 70	66	-3 1/2	-5.0
O	COMPUTER NETWORK	5- 9	5 1/4	0	0.0
O	COMPUTER ASSOC INT'L	18- 37	36 3/4	+1 3/4	+5.0
O	COMPUTER HORIZONS	5- 11	11 3/4	-3/4	-6.0
N	COMPUTER SCIENCES	13- 36	35	-1 1/4	-3.4
O	COMPUTER TASK GROUP	10- 26	25 1/2	-1/2	-1.9
O	COMPUTER USAGE	1- 3	2	0	0.0
O	COMPUTONE SYSTEMS	4- 11	3 3/4	-1/8	-3.2
O	COMSERV CORP	1- 6	4 1/2	0	0.0
O	COMSHARE	7- 12	10 7/8	-1/8	-1.1
N	CULLINET SOFTWARE	13- 33	13 1/8	-1 1/4	-8.6
O	CYCARE SYSTEMS INC	19- 27	26	-1/2	-1.8
O	HOGAN SYSTEM INC	4- 12	6 7/8	0	0.0
N	GENERAL ELECTRIC CO	56- 78	77 3/4	+3/4	+0.9
N	GENL MOTORS E (EDS)	20- 47	46 1/2	+7/8	+1.9
N	GTE CORP	38- 52	52	+5/8	+1.2
O	INFORMATION SCIENCE	1- 5	2 3/4	-1/4	-8.3
O	INFOTRON SYSTEMS CP	13- 24	17 1/4	-1/2	-2.8
O	KEANE ASSOCIATES	10- 20	13 1/2	-1/2	-3.5
N	LOGICON	25- 43	36 3/4	-1/4	-0.6
O	LOTUS DEVELOPMENT CP	15- 34	28 3/4	+2 3/4	+10.5
O	MCI COMMUNICATIONS	7- 13	12 3/8	-5/8	-4.8
O	MNGT SCI AMER INC	7- 16	14 1/2	+7/8	+6.4
O	MATHEMATICAL APP GRP	1- 8	1 7/8	0	0.0
O	MICOM SYSTEMS INC	12- 35	16 1/4	-2	-10.9
O	MICROPRO INT'L CP	2- 4	3	+3/8	+17.0
O	NATIONAL DATA CORP	8- 19	19 1/8	0	0.0
O	ON-LINE SOFTWARE INT	4 12	11	-1/2	-4.3
N	PANSOPHIC SYSTEMS	14- 30	28 3/4	1/8	0.4
N	PLANNING RESEARCH	11 22	22	+2	+10.0
O	POLICY MGMT SYSTS CP	16- 35	17 1/4	-1/4	-1.4
O	PROGRAMMING & SYS	4- 9	7 3/4	-1/4	-3.1
O	REYNOLDS & REYNOLD	31- 65	65	+2 1/4	+3.5
O	SEI CORP	13- 27	23 1/2	-2 1/4	-8.7
O	SHARED MEDICAL SYST	26- 38	38 1/8	-1/8	0.3
O	SCIENTIFIC COMPUTERS	5- 8	4 1/2	3/8	7.6
O	SOFTWARE AG	12 22	19 1/4	+5/8	+3.3
N	URS CORP	10 17	16 3/4	0	0.0
N	UCCEL	11 18	17 1/8	7/8	4.8
O	VM SOFTWARE	17 24	20 1/4	+2 1/4	+12.5

SEMICONDUCTORS

EXCH		52-WEEK RANGE (1)	PRICE CLOSE MAR 19 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO OEV	22- 36	30 5/8	1 1/8	-3.5
O	ADV'O SEMICONDUCTOR	7- 23	12 3/4	3/4	-5.5
N	ANALOG DEVICES INC	18- 31	29 1/2	1/4	-0.8
O	ANALOGIC CORP	11- 16	13 1/2	-3/8	-2.7
N	APPLIED MAGNETICS CP	9 19	16 3/8	-2 7/8	-14.9
O	AVANTEK	18 26	21 1/4	+7/8	+4.2
O	HADCO CORP	3- 7	4 1/2	1/8	-2.7
O	INTEL CORP	21- 33	27	1 1/2	5.2
O	MICRO MASK INC	6- 12	6 3/8	-1/8	1.9
N	MOTOROLA INC	29 45	44 3/4	+1/4	0.5
N	NAT'L SEMICONDUCTOR	10- 15	14 3/8	+1/8	+0.8
N	TERAOYNE	17- 33	24 3/4	-3/8	1.4

PERIPHERALS & SUBSYSTEMS

EXCH		52-WEEK RANGE (1)	PRICE CLOSE MAR 19 1986	WEEK NET CHNGE	WEEK PCT CHNGE
P	AM INTERNATIONAL	3 8	7 1/2	1/8	-1.6
A	ANOERSON JACOBSON	2 5	2 1/8	-1/8	-5.5
O	AST RESEARCH INC	7 33	20 1/8	+1 1/2	+8.0
O	AUTO-TROL TECHNOLOGY	3 13	5 3/4	-1/8	-2.1
O	AVANT-GARDE COMPUTNG	3- 21	4 3/4	-1/4	5.0
O	BANCTEC INC	6- 12	11 1/8	+1 5/8	+17.1
O	BEEHIVE INT'L	1 2	1/8	0	0.0
N	BOLT.BERANEK & NEW	20- 39	38 3/8	-3/8	-0.9
O	CAMBEX CORP	1- 3	1 1/4	0	0.0
N	CENTRONICS OATA COMP	3- 11	5 5/8	0	0.0
A	CETEC CORP	6- 9	8 3/8	-3/8	-4.2
A	COGNITRONICS	4- 7	4 1/4	-1/8	-2.8
N	COMPUGRAPHIC CORP	23- 36	24 3/4	-3/4	-2.9
O	COMPUTER TRANSCEIVER	0- 1	5/8	0	0.0
N	COMPUTERVISION CORP	9- 44	16 3/4	+1/8	+0.7
N	CONRAC CORP	12 18	16 3/8	-1/2	-2.9
A	OATAPROOUCTS CORP	11- 20	15 1/2	+1 1/8	+7.8
A	DATARAM CORP	4 14	12 3/4	1 1/8	-8.1
O	DATA SWITCH CORP	4 9	5 1/2	-3/8	-6.3
O	DATUM INC	5- 9	5 1/2	+1/8	+2.3
O	DECISION OATA COMPUT	10 20	11 3/4	1/8	1.0
O	ENDATA, INC	2- 8	6 5/8	+1	+17.7
O	EVANS & SUTHERLAND	12 24	21 1/4	2 1/4	9.5
O	GANDALF TECHNOLOGIES	5- 13	6 1/8	+3/8	+6.5
N	GEN'L DATA COMM INO	8- 21	11 1/4	-1	8.1
N	HAZELTINE CORP	20- 30	21 5/8	-1/8	-0.5
O	ICOT CORP	3- 12	12	+1	+9.0
O	INFORMATION INTL INC	10- 17	13	1/8	-0.9
O	INTECOM INC	4 11	3 7/8	-1/4	-6.0
A	LUNOY ELECTRONICS	10- 15	14 1/4	0	0.0
O	MEGADATA CORP	3- 8	3 5/8	+1/4	+7.4
A	MSI DATA CORP	7- 13	12 1/8	1/8	1.0
N	NASHUA CORP	24 42	41 3/4	+3/4	+1.8
O	NETWORK SYSTEMS CORP	11 27	11 3/8	7/8	7.1
N	NO AMERICAN PHILIPS	32- 45	44	+1/8	+0.2
N	NORTHERN TELECOM LTD	26- 41	29 7/8	+7/8	+3.0
O	OMEX	1 3	3/8	0	0.0
N	PARADYNE CORP	6 18	8 3/8	0	0.0
A	PENRIL CORP	7 14	7 7/8	0	0.0
N	PLESSEY CO (ADR)	19- 32	31 5/8	1/4	0.7
O	PRINTRONIX INC	9- 18	13 1/4	+1 1/8	+9.2
O	QMS INC	6 16	11 1/8	-1/2	-4.3
O	RAMTEK CORP	2- 7	3 1/4	3/8	10.3
N	RECOGNITION EQUIP	9- 17	14 1/8	-1 3/8	-8.8
N	SANDERS ASSOCIATES	30- 44	40 5/8	1 1/4	2.9
O	SCAN-TRON CORP	9- 20	20 1/4	+1/2	+2.5
N	SCIENTIFIC ATLANTA	10- 15	14 1/4	+5/8	+4.5
O	SEAGATE TECHNOLOGY	5- 11	10 1/8	5/8	5.8
N	STORAGE TECHNOLOGY	1 5	4 3/8	1	18.6
O	SYKES DATATRONICS	0- 2	3/8	1/16	6.2
A	T BAR INC	5- 9	6 3/8	+3/8	+6.2
A	TAB PRODUCTS CO	14 22	21 1/2	+5/8	+2.9
O	TANDON CORP	3 9	5 1/8	1/2	8.8
A	TEC INC	6 13	6 5/8	-5/8	8.6
N	TEKTRONIX INC	47 68	60	1/8	0.2
N	TELEX	34 68	63	3	4.5
O	TESDATA SYSTEMS CP	0 3	1	+1/8	+14.2
N	TIMEPLEX INC	15 23	15 1/2	1/4	1.5
N	TITAN CORP	4 11	10 3/4	+1/8	+1.1
O	VISUAL TECHNOLOGY	1 3	7/8	0	0.0

LEASING COMPANIES

EXCH		52-WEEK RANGE (1)	PRICE CLOSE MAR 19 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	7 21	20 7/8	+1 1/8	+5.6
N	CONTINENTAL INFO SYS	5 20	19 1/2	+3/4	+4.0
O	FINALCO GROUP INC	4 5	4 1/2	1/8	2.7
O	PHOENIX AMERICAN INC	2 4	3 7/8	1/8	3.1
O	SELECTERM INC	7 12	6 3/4	1/2	6.8
N	U S LEASING	32 44	43 1/2	+1 3/4	+4.1

Source: Trade Quotes, Inc.

COMPUTER INDUSTRY

INSIDE

Manufacturers of minisupercomputers are preparing to make initial public offerings/**139**

Recent government rulings favoring domestic chip makers are only a temporary solution, analysts say/**140**

Heinz Nixdorf, West Germany's prominent computer industry executive, died last week at age 60/**164**

INSTANT ANALYSIS

"The differences of view between myself and current management on the operation of Automatix make it appropriate that I leave the board."

— Philippe Villers, announcing his decision last week to resign as chairman of Automatix, Inc.

Leasing firms eye strategies

Slow start challenges the way lessors do business

By Clinton Wilder

LAS VEGAS — The third-party computer leasing industry is off to a slow start this year, and that is challenging the way leasing firms market their business, according to executives of the industry's largest companies.

Speaking at the Computer Dealers and Lessor's Association (CDLA) spring meeting last week, leasing executives blamed user uncertainty over repeal of the investment tax credit, an increasingly lower mainframe residual value forecast and particularly slow IBM first-quarter product shipments for squeezing margins in the leasing business.

"There aren't enough deals to go around," said John Bartolo, executive vice-president and chief operating officer of CIS Corp. in Syracuse, N.Y.

Lessors' opinions differed on how long the slowdown will last, but most agreed that leasing firms, especially larger ones, will be best served by diversifying away from leasing only IBM equipment.

"The IBM business this year will be a trading business, it won't be a boom for leases," said Robert Bardagy, senior vice-president of marketing with Comdisco, Inc., the largest independent lessor. "I won't sit back and wait for IBM to deliver products."

Comdisco, with business in disaster recovery, risk arbitrage and other specialized services, is one of many lessors making the trend toward diversification.

In addition to systems from non-IBM mainframe and large minicomputer vendors, some said that telecommunications equipment, such as private branch exchanges, offers a major third-party leasing opportunity.

"Our game plan for the last few quarters has been a transition into telecom-

See **LEASING** page 164

Control Data to offer software support for IBM and DEC users

By Rosemary Hamilton

MINNEAPOLIS — Control Data Corp. last week announced plans to offer third-party software support services to users of Digital Equipment Corp. and IBM equipment.

"We're proposing this to our customer base to enhance our position with them," said Gary Mertz, vice-president of sales and marketing at CDC's Engineering Services Group.

The move, described as "quite uncommon," by one observer, is CDC's formal step into the software support market. Initially, the services will be provided in Washington, D.C., Boston and Chicago. They will be offered as prepackaged products, ranging in price from $6,000 to $18,000 per year.

"I think it's a workable idea," said D. R. MacNaughton, president of Business Development International in Franklin Lakes, N.J. MacNaughton, who tracks the third-party maintenance market, said there are few vendors providing this type of software support. "If you are a captive customer for a vendor, prices are higher," he said. "If there are other sources, it's likely that you'll get better treatment. MIS managers need these alternatives."

A DEC spokesman said the company had no comment about CDC's plans. "We're not in a position to comment on something we just heard about," he said. An IBM spokeswoman also declined to comment.

The CDC services cover both the DEC and IBM operating systems, compiler languages and utilities, Mertz said. While applications packages are not covered by the services, CDC staff will assist customers in isolating problems with applications programs when possible, he added.

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INDUSTRY INSIGHT
Bob Djurdjevic

Happy days are here again

One day shy of Sierra's birthday and three days short of the day of hearts and flowers, IBM celebrated the birth of a new generation by shooting its older children full of holes.

Such spectacles used to be the computer giant's usual fare in the late 1970s, when plug-compatible manufacturers forced IBM into price wars. In the 1980s, however, IBM's new product birthday parties have been much more sedate.

In the wake of IBM's most sweeping price cuts since 1979 lie the mortally wounded bodies of yesterday's crowd favorites, such as the 3080s and the 4361s. Even the early 4381 models took serious hits, which will shorten their lives by about a year. In short, the value of all 370-type CPUs were affected, in one way or another, by IBM's action. So, what actually happened on that memorable Tuesday?

In a single announcement, IBM unveiled the uniprocessor engine that drives the 3090s, cut the prices of its older 3090 models and introduced four new 4381 models. It also slashed the 3080 prices by up to 21%, withdrew the 4341 from marketing and announced a host of new software. In other words, the company sent the message to the marketplace that it was back playing hardball again.

As with any major announcement, there were winners, and there were

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Djurdjevic is a computer industry analyst and president of Annex Research, a Phoenix-based computer research and consulting firm. His industry insight column will appear monthly.

Stratus symbol: Start-up preserves corporate accessibility

Firm maintains culture despite 99% growth rate

By Clinton Wilder

MARLBORO, Mass. — On one Friday every month, Stratus Computer, Inc. President and Chief Executive Officer William E. Foster eats lunch with his employees at a gathering affectionately dubbed "Stratapizza." Over take-out pepperoni and mushroom pies at corporate headquarters, Foster and other Stratus executives announce employee awards and talk about the latest success of the 6-year-old wunderkind of fault-tolerant computing.

The monthly pizza party is the most outward example of the corporate accessibility that Foster strives to maintain as Stratus grows, which it has done at an average annual rate of 99% since 1985. The company reached the $80 million revenue plateau last year but refuses to hire either a public relations agency or an investor relations director. "We want to make sure the public and Wall Street get the straight story," Foster says.

Stratus CEO
William Foster

The same corporate philosophy is reflected in how Stratus wants to sell its online transaction processing minicomputers. Stratus is the first company ever to have a complete CPU line private-labeled by IBM, but Foster stresses that the landmark January 1985 OEM deal to supply IBM's System/88 is the exception, not the rule.

"Every start-up in this field since 1980 has gone primarily into sales through OEMs or distributors," Foster says, "but we don't want to do that. With OEMs, you're never sure if there is a real demand for the product or if it's just sitting in a warehouse. We know where our product is sold and how it's being used. That's something that we value more than growth — the quality of our customer interface."

Although Foster does not expect sales to IBM to account for too much more than the 15% of Stratus revenue that they did in 1985, the value of an OEM relationship with Big Blue has other obvious advantages. It gives Stratus a large dose of what it was already gaining on its own — credibility.

"Two years ago, potential customers would frequently ask me how they could know if we would still be in business in five years," Foster says. "We had to sell the company as much as the product. We don't have to do that anymore."

The double-edged sword of selling computers to IBM is that the System/88 competes directly with the Stratus machines on which its configurations are based — the FT 200, XA 400 and XA 600. Some observers speculate that IBM will eventually develop fault-tolerant characteristics for its

See **STRATUS** page 144

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2. Computer Intelligence Corporation, 1985.
3. *Datamation,* 1984.

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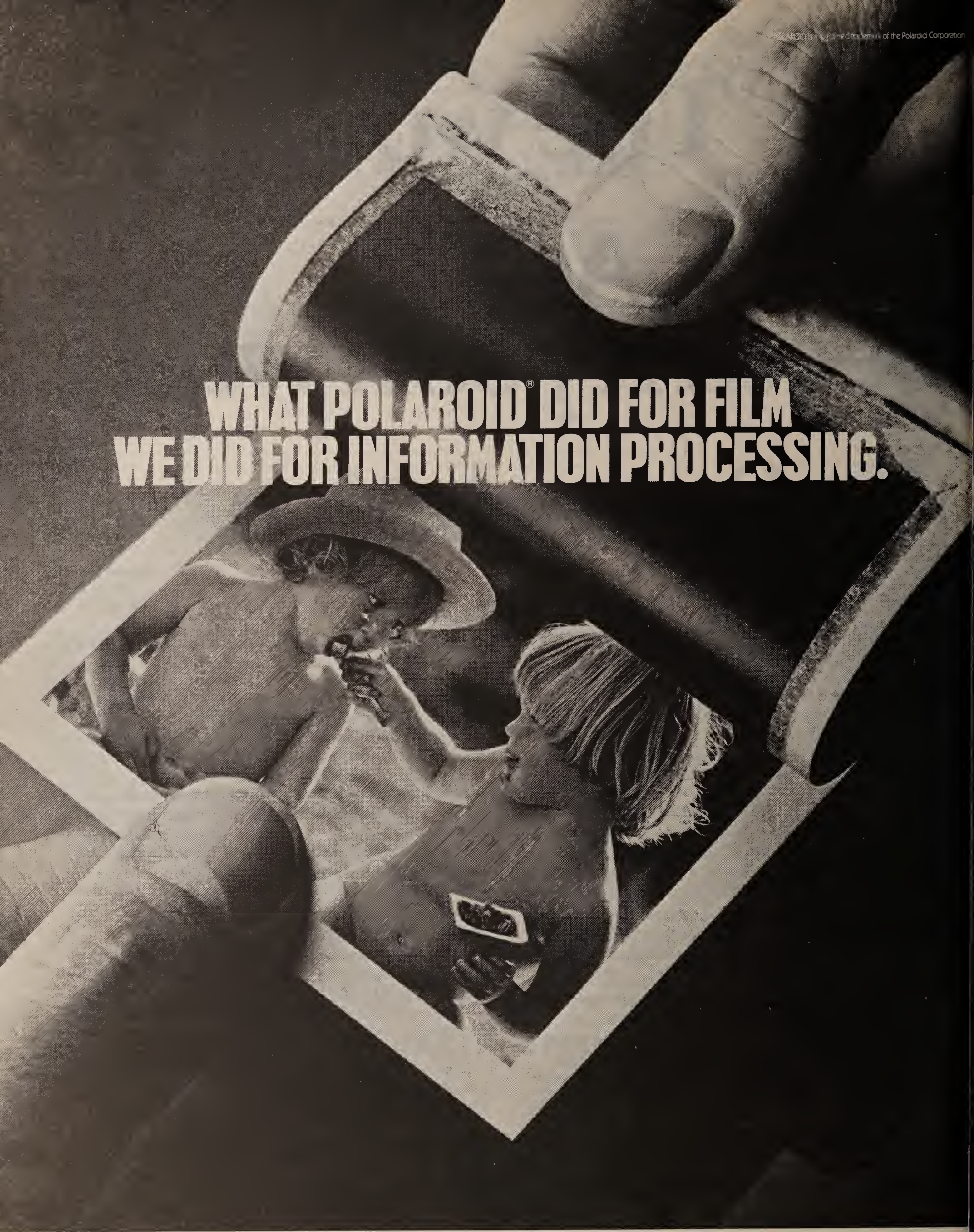
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